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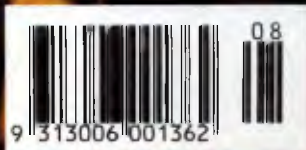
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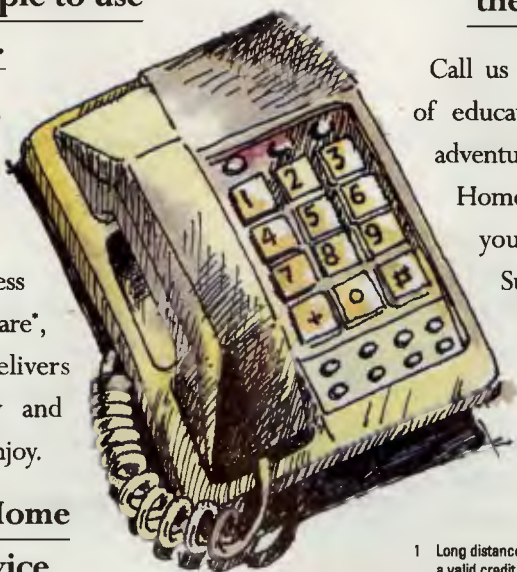
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Biscuits, brands and barriers

All the rules about how you choose a product get thrown out when the product comes to you via the Net.

By Jeremy White

What makes you decide where to go when you go online? Do you click on every link you see, surfing promiscuously and never routing to the same IP address twice? Or do you linger over a coterie of favourite sites that you visit frequently and predictably, only very occasionally straying for a casual one-site stand? Perhaps you set out without preconceptions, and go where your ISP tells you with those carefully positioned links and banners?

Having recently spent a few days at a publishing conference that focused on marketing, I've got brands on the brain. I

value for money. However, my ability to get to the products in which I'm interested is controlled to a significant extent by how they're distributed.

The major supermarket chains know down to the square foot how to control product placement on shelves to steer people towards those products on which they get better return, or which they have particular reason for shipping in volume. As I wander down the lanes in a mass-market pre-programmed trance, I follow a mix of my brand instinct and the distributor's signposts.

My escape has always been the Net. The Net — I've always felt — is going to

by individual independent artists garnering strong audiences on their own Web sites, while the major recording companies try to brand their company names.

Usually when someone buys a record, they do so because they know they like the artist. The artist is the brand that matters. But to the recording companies, their 'label' is what they want to be the brand.

In the real world, they can control this to some extent. On the Web, they can't. If I like the Rolling Stones, I'll search for the Rolling Stones, and neither care nor need to know about the label.

But the middle-folk are fighting back online. Excite, Yahoo, AOL and many of the other major Net players see themselves as distributors and believe that distribution is the key to electronic commerce. With so many Web sites fighting for eyeballs, a company such as AOL, with 8.5 million customers, argues that a service such as the one it offers is really the sort of place other companies need to be to promote their sites.

This has led to sites like Amazon.com — the popular bookseller — signing partnership deals with distribution sites such as AOL. Amazon becomes the premiere book retailer on AOL, and in return AOL receives a segment of the revenue from Amazon's sales.

To me, this looks like supermarkets.

I'd like to know what drives where you go online and where our readers see electronic commerce heading. Do you remember the brands of your favourite sites, or do you go where Yahoo leads you? Will disintermediation and barrier-free competition triumph on the Net? Or will distributors like ISPs and directories successfully use their subscriber numbers and hit rates to control who goes where?

I'm interested to know what you think, so please visit apcmag.com and let me know.■

I get quite a kick from the fact that I've normally read the *New York Times* before the *New Yorkers* themselves have.

now know all about what makes people buy toothpaste or soap and visit one supermarket chain over another. But I've been left with quandary.

I know that if I'm buying snack foods I have a big soft spot for (or maybe because of) Toblerone and Arnott's Scotch Finger Biscuits. When I walk into Woolworths to buy my Arnott's and Toblerone (and my Colgate to repair the damage), I sometimes get sidetracked by the big bundle of low-priced Westons and Close Up sitting at the end of the aisle. I might even try a block of Cadbury if there's a good deal on. If I'm looking for kitchen towels or just about everything else after coffee and chocolate, I probably don't care about the brand and want no frills and the cheapest price, in which case I'll follow the specials.

As a consumer, there's clearly a mix of brand and distribution at play here. I have my favourite brands, and where the brand is irrelevant to me my next concern is

slaughter middle-folk who don't themselves provide a useful service. It promises a raw free-market world where the barriers between consumers and brands are largely removed.

Media is the first example. Traditionally, if I wanted to read stories from the *New York Times*, there was only one practical way that was likely to be possible. And that was if a handful of stories were reprinted under licence by an Australian newspaper. Now I can go straight to the source. I get quite a kick from the fact that I've normally read the *New York Times* before the *New Yorkers* themselves have.

The second is music. For the first time ever, independent record companies internationally have a greater market share for recording artists than the single biggest major company. The health of the independents has been fuelled by self-bankrolling artists who produce their own CDs and even sell direct. And on the Net, it's been fuelled

NEWSWIRE

19

ActiveX: The big MS flop	19
Censor's knife resharpened	19
Senate scraps computer bounty	22
New floats in favour	22
NetPCs fail to excite	24
PCs attack the enterprise	24
Local ISPs regroup	24
Netscape preaches crossware	26
Stockdale's MS licensing swipe	26
News roundup	19
ANALYSIS	
Missed opportunities online	28
Back from the cutting-room floor	30

FORUM

49

READERS' SAY	61
--------------	----

TWO BITS

Helen Dancer	
On a higher plane	49
Jeremy Horey	
Standard approach	50
Jeremy Torr	
The problem with widgets	52
Bruce McCabe	
Hitting the target	54
John Sterlicchi	
A better option	56
Phillip Argy	
Seeing is believing	58

PRICE WATCH

Scanners are having their day as the must-have home peripheral	63
--	----

SERVICE AND RELIABILITY

One reader's hair-tearing experience with Encyclopaedia Britannica	65
<i>By Roulla Yiacoumi</i>	

CORPORATE

Novell looks to border management for a new product direction	66
<i>By Simon Sharwood</i>	

SMALL BUSINESS

How life cycles can determine when you should buy	68
<i>By Jeremy Torr</i>	

FAMILY

Kids are taking over the design of the Internet	70
<i>By Nick Moraitis</i>	

REPROGRAMMING

Old PCs shouldn't be automatically destined for the trash heap	72
<i>By Selina Mitchell</i>	



Hack attack!

Military and commercial sabotage, bank blackmail, credit-card fraud, political activism — it's all here 80
By Craig Stephens

Provisions of the Computer

Crimes Act	82
Finders keepers	84
<i>By Dominique Jackson</i>	
Official hacks	87
<i>By Dominique Jackson</i>	

The search for Optik Surfer

<i>By Dominique Jackson</i>	88
Hackers with (ethical) attitude	88
<i>By Dan Tebbutt</i>	



Java on the boil

It's the word on everybody's lips (and the excuse for more coffee puns than any ordinary individual could tolerate). How far does Java still have to go before fulfilling its early promise?	92
<i>By Dan Tebbutt</i>	
Profile: Miko Matsumara	94
<i>A short black of Java</i>	98

Putting Java to work: the development tools market

<i>By Dominique Jackson</i>	100
Java applications: an Australian perspective	101
<i>By Angus Kidman</i>	
Pour yourself a strong cup	102
<i>By APC Staff</i>	

PROFILE

75



Thomas Dolby

Thomas Dolby, the early '80s technopop pioneer responsible for the classic hits 'Hyperactive' and 'She Blinded Me With Science', has a new job: building the sound technology that could turn Java into a corking multimedia environment

By Dan Tebbutt

TECHNICAL

110

CLUSTERING TAKES OFF

Clustering is hot news again since it's become available for the Wintel architecture — but just what does it involve?

110

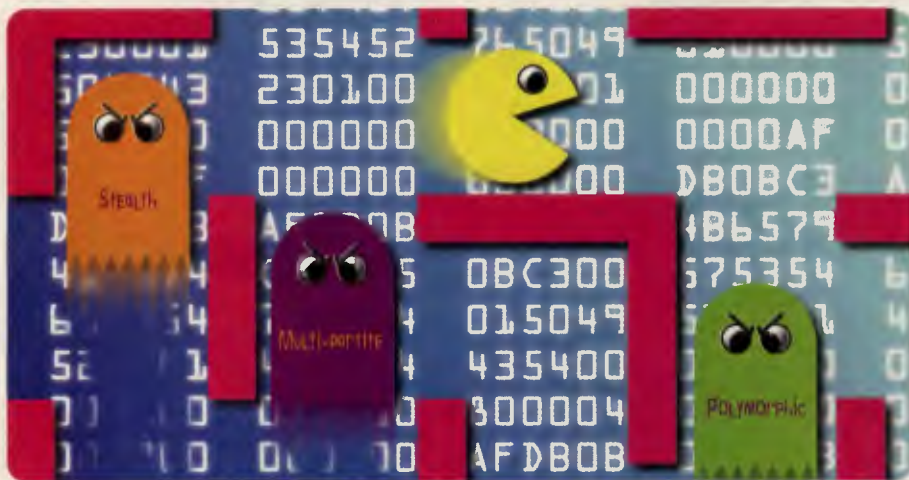
By Dominique Jackson

INFECTIOUS BEHAVIOUR

Just how do computer viruses work, and what steps can you take to prevent them from damaging or destroying your data and software?

113

By Ashton Mills



FEATURE

107

WHO YOU CALLING A DUMMY?

The man who created the popular 'Dummies' series of how-to books reveals his thoughts on technology, sex and training.

107

By Roulla Yiacoumi

The Web cult of stupidity

108

By Angus Kidman



SOFTWARE

121

PRETTY AS A PICTURE

Bitmap and vector tools are being combined to make powerful new drawing and painting programs

121

By Jim Endersby

Editors' Choice

124



HARDWARE

135

MMX NOTEBOOKS

Although MMX is still a relatively new technology even for desktops, MMX-enabled notebooks are now emerging in quantity from major vendors. APC Labs examined 11 of the latest 166MHz models and found that, while current MMX notebooks are pricey, they can deliver strong performance for demanding mobile users

135

By Roulla Yiacoumi

Name your spec

142

How we tested

138



AcerNote Nuovo 32/3100	136
Presario 1082	136
Latitude LM M166ST	138
Hi Note VP 575	140
2000 Solo 9100XL	140
HP OmniBook 800CT 5/166MMX	142
ThinkPad 760XD	144
Versa 6200	144
PC-9800T	146
TravelMate 6160	146
Tecra 740 CDT	148



CorelDRAW 7	122
Designer 7	124
Freehand 7	126
Illustrator 7	130
Canvas 5	132

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INNOMEDIA

FIRST TAKE

32

US ROBOTICS COURIER V.EVERYTHING AND NETCOMM ROADSTER 56

The latest 56Kbps modems 32
By Lachlan Botticchio

APPLE MAC OS 8

A strong, useful Mac upgrade 33
By Dan Tebbutt

**CREATIVE INFRA2400 AND PLEXTOR 12/20PLEX**

CD-ROM drives with speed or remote controls 34
By Roulla Yiacoumi

NOKIA CELLULAR DATA SUITE

A cheaper alternative for connectivity 34
By Selina Mitchell

LOTUS WEBLICATOR

Combines offline browsing with notification 36
By Josh Gliddon

SONY DSC-F1

Advanced digital photography 36
By Travis Simon

MYOB 7

Accounting software upgrade 38
By Jeremy Torr

POINTCAST NETWORK 2.0

Key update to this push technology 40
By Angus Kidman

POWERQUEST DRIVECOPY

For copying hard disks the easy way 40
By David Lin

QMS DESKLASER 600

A small, good-quality printer 42
By Dominique Jackson

LEXMARK OPTRA 1250S

High-quality inkjet 42
By Jeremy Torr

CAKEWALK PRO AUDIO 6

Music recording, editing and publishing 44
By Eric Holroyd



AFTER HOURS

223

BIBLIOFILE

Get your Web site to perform for you with our selection of Web-marketing titles 223
 Perspective: a war of words 228

INTERACTIVE

They print text and pictures; they offer sound, video, photographs and quizzes; and they're getting cheaper. We check out the new breed of all-singing, all-dancing encyclopedias 229
 Interactive news 230

GAMEZONE

More bloody combat in galaxies far, far away, plus some cute kids' stuff 233
 Games news 233

WEB FILE

Free your body and your mind will follow Web File all the way to the University Co-op Bookshop, Wild FM and a hacker magazine 237
 Surfbaud: I spy 238

CHIP CHAT

Come to the place where mindlessness, dentists and Diana Ross collide 240
 Contest: Ain't no mountain thick enough 240

CD CONTENTS 12

CREDITS 13

ADVERTISERS' INDEX 14

MARKETPLACE 211

CD INFORMATION 221

CONTACT INFORMATION 221

WORKSHOP

151

CONTENTS 151**TECH TALK**

Chipsets and what they mean for performance 153
By Lachlan Botticchio
 Technobabble: all about modems 155
By Nathan Taylor

OPERATING SYSTEMS

Tips and tweaks for Windows 95 157
By David Flynn
 Looking good in OS/2 159
By Ashton Mills
 Mac scripts and macros 161
By Stephen Withers

**PROGRAMMING**

Variables and errors in JavaScript 163
By Travis Simon
 Developers Corner: dealing with the millennium bug 165
By Michael Smith
 Bug of the Month 166
 Hypertext: get your Web page happening fast 155
By Lee Borkman

SHAREWARE

Freebies for Windows 171
By David Nourse
 Time-management utilities 173
By Pradeep Sriganesh
 Hotline, the new Mac protocol 175
By Ari Weisz-Koves

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apcmag.cd

Volume 2.8, August 1997

August's apcmag.cd is overflowing with different software for you to try.

ISP starter kits this month include:

GigaNet

GigaNet has provided its connection software for APC readers. Check out the information in the ISP Kits section or load the software from d:\isp\giganet\setup.exe. To access special offers available only to APC readers, please enter voucher number APC 8897 when you access the GigaNet starter kit on apcmag.cd.

Telstra Big Pond

If you want to use Telstra's Big Pond service, take a look at its detailed information page on the CD or, if you just want to sign up, load d:\isp\bigpond\setup.exe.

What's on August apcmag.cd:

First Take

Lotus Weblicator ■ PointCast Network 2 Client

Features

Antivirus utilities

Norton AntiVirus ■ ForeFront Anti-Virus ■ Boot Minder 2.0 ■ Cheyenne AntiVirus ■ Disinfectant 3.6 ■ EMD Armor ■ Gatekeeper 1.3 ■ Sweep ■ VirusNet 95 4.01.

System utilities

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Reviews

High-end graphics

Adobe Photoshop 4.0.1 Update ■ Adobe Photoshop 4.0.1 Plug-in SDK ■ Macromedia Flash ■ Adobe Illustrator ■ Alien Skin Eye

Java

PowerJ ■ JRE 1.1.2 ■ Microsoft SDK 1.5 ■ Activator 2.0 ■ Chicory Alpha 1.0 ■ ED 3.72a ■ Jamba ■ Jpad 3.1.1 ■ Javelin 5.03.6 ■ MRJ 1.0.2 ■ Netscape Internet Foundation Classes 1.1.

Additional software

Beatnik 1.1

Workshop

Super Note Tab 2.62a ■ Font-o-Matic 1.04 ■ Your Spell 1.0 ■ Organic Art Microsoft Edition 1.20.04 ■ Arachnophilia 2.1 ■ CRONrgf 1.0 ■ Home Run Scheduler 1.02 ■ Arieel 3.0 ■ RoboJob 2.31 ■ Address Book 1.6 ■ Meal Planner 1.8 ■ Cal 1.0 ■ Hotline Client 1.1b21r2 ■ Hotline Server 1.1b21r2 ■ Hotline Tracker 1.1b21r2 ■ Animated Mouse Pointers for OS/2 ■ npswps.zip ■ Sound Scheme Editor ■ Warp Enhancer

GameZone

Need for Speed II ■ Microsoft Soccer

Bandwidth Busters

Lotus Notes 4.6 Pre-release 2

Reader Requests

Adobe Acrobat Reader

Browsers

Microsoft Internet Explorer Platform Preview Suite 4.0 ■ Microsoft Internet Explorer 3.02 ■ Netscape Communicator Pro 4.0.1 ■ Netscape Communicator 4.0.1 ■ Netscape Navigator 3.01 ■ Netscape Navigator Gold 3.01 ■ Netscape Navigator 2.02 International Version ■ Emissary 2.0 ■ NCSA Mosaic ■ Internet Advturer 0.96 ■ Netcomber ■ WebExplorer 1.1h

Internet Toolkit

WS Archie ■ fpArchie 0.9 Beta 1 ■ Anarchie 2.01 ■ WS Finger ■ Finger 1.5 ■ Gibbon Finger ■ Thumb 1 ■ CuteFTP 1.8 ■ WS_FTP Pro 4.12 ■ NCFTP ■ WSGopher ■ LA Gopher 1.1 ■ Turbo Gopher VR 2.1a4 ■ mIRC 5.02 ■ PIRCH ■ ICQ 1.10 Beta ■ GT IRC 1.04 ■ IRC/2 0.78 ■ IRCLE 3.0 ■ Eudora Pro 3.01 ■ Pegasus Mail 2.53 ■ Microsoft Mail and News ■ PMMail 1.91 ■ Post Road ■ Forté Free Agent 1.1 ■ OUI 1.5 ■ Microplanet Gravity 1.1 Beta 2 ■ InterNews 2.02 ■ WS_Ping ■ vEMX Ping ■ Mac Ping 1.1 ■ CRT 2 Beta 5 ■ Net Term 4.1 ■ NCSA Telnet 2.7b3

Archiving utilities

WinZip 6.2 ■ PKZip ■ WinPack ■ Stuffit Expander ■ RAR Archiver ■ LHARC 2.22 ■ PMZipper 1.4 ■ MacBinary II 1.0.1 ■ MacGZIP ARJ 2.55 ■ LHA 2.13 ■ Ultra Compressor Pro II



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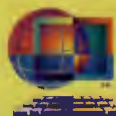
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Features in September's APC will include:

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Advertising index

Acer	41	Mitsubishi	117
ACS	112	Mitsui	133
Adobe	71	NEC	89
AES	152, 231	NetComm	60
American Power Conversion	109	Omnitron	147
Arrow Research	91	Powerquest	99
ASP Microcomputers	141	Primax	139
Beyond Computers	15	Reckon Software	53
Borland	106	Samsung Electronics	29, 77, 95
Brother	18	Sony	46, 47
Canon	23, 25	Switch Communications	106
CBA	137	Sybase	67
Cheyenne	119	Synnex Mitac	167
Claris	37	Telstra Big Pond	2, 3
Compaq	43	Telstra Go	45
Compucon	51	Toshiba	27
CompuServe	12	US Robotics	16, 17
Conlab	168	Westan	11
Corel	131	XSI	112
Creative Pacific	9, 39, 55		
Cybec	48	Channel	
Cyber Payments	62	New Magic	177
Datatech	21	IPS	178
Dell Computer IFC gatefold,	1	Flextools	180
DH Technology	73	Edge	181, 182
Dynalink	35	Samsung Electronics	183
Epson	57		
ERA	74	SuperMarket	
Focal Point	59, 85	PC Zone	187
Fuji Xerox	78, 79	Harris Technology	188, 189
Fujitsu	69	City Software	190, 191
GigaNet	170	Forte Computers	192
Hearne	120	Butek	193
Hyundai	31	AVO	194, 195
Innovision	143	Corporate Software	196, 197
Intel	4, 5	Modem Superstore	198
Internet World	104, 105, 115	Software Today	199
Kodak	14	Laserbaud	200, 201
Konicon	127	Microtech	202
Macase	134	Amadeus	203, 204
Magtron	123	Dragon Dictate	206
Micrografx	125	Sigmacom	207
Microgram	225	Australian Computer Group	208
Micropro	OBC	ADE	208/209
Microscience	145	Software Warehouse	209, 210
Mitac	IBC		

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Editor Jeremy White – Australian Personal Computer
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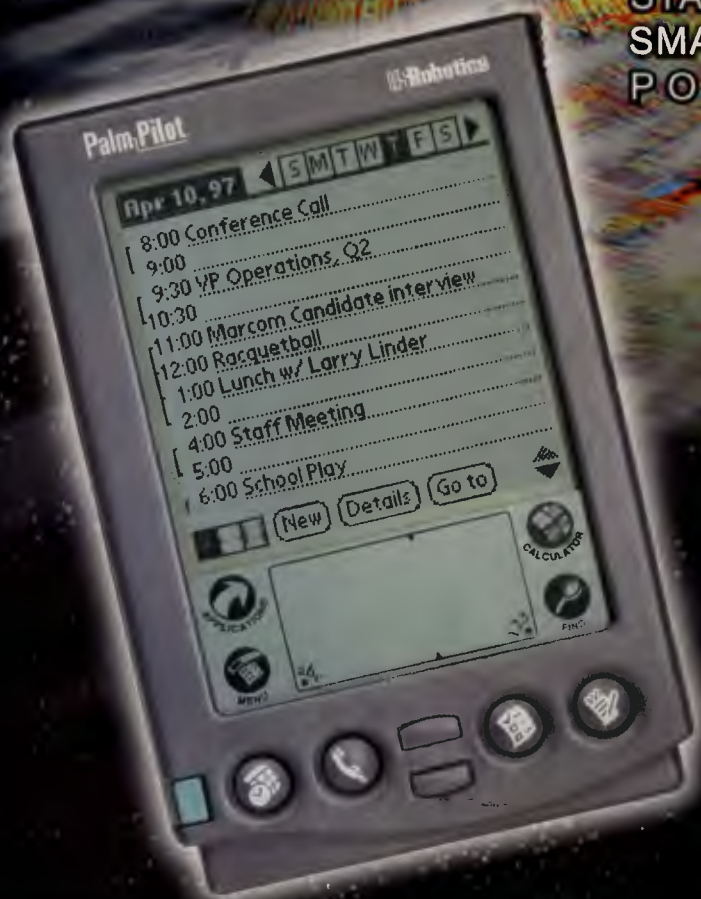
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DEVELOPER LETDOWN

ActiveX: The big MS flop

Towards the end of June, Microsoft began warning users of its Internet Explorer (IE) browser that they would have to download a new patch if they wished to continue using ActiveX controls. This was because the current batch of control certificates expired on June 30, and new certificates require an updated version of the Authenticode technology that Microsoft licenses from VeriSign. The certificate-based model — which allows IE to confirm that controls do originate from a named and registered developer — has long been touted by Microsoft as one of the key advantages of ActiveX over rival component software technologies such as Java.

The updating of certificates inspired several publications to examine just how successful ActiveX had been as a challenger to Java. The conclusion? Java won hands down. One study by US consultancy Application Methods examined 20 million Web pages, and found that while 30,000

Continued on page 20

NEW REGULATION PLAN

Censor's knife resharpened

Forget Iron Mike Tyson chomping down on Evander Holyfield; the Australian Senate proposes to take a savage bite out of the ear of the Internet with a range of restrictive and repressive recommendations, setting the scene for a heavyweight fight of its own as the local Internet community gears up to take on the policy-makers.

The Select Committee on Community Standards Relevant to the Supply of Services Utilising Electronic Technologies released the third part of its investigation, dealing with online services, in late June. Ironically, the release of the recommendations came only hours before the US Supreme Court's announcement that it had ruled similarly repressive measures written into the controversial Communications Decency Act (CDA) to be unconstitutional.

The Senate committee is made up of one senator each from Western Australia, New South Wales, Queensland and South Australia, and two each from Victoria and Tasmania. Of these, three are

Representative spread?

While the Senate committee covers the full gamut of political persuasions, it doesn't have the same spread in technological terms; only Democrat Senator Natasha Stott Despoja has her own email address.

Electronic Frontiers Australian is running an 'Adopt A Polle' campaign to decrease this kind of computer illiteracy amongst politicians. For details, check <http://www.efa.org.au>.



Liberal, two ALP, one Democrat, one Independent and one National Party. Despite this apparently representative spread, Democrat Natasha Stott Despoja is alone in nominating an email address as a means of contact.

This, according to South Australian Internet Association vice-president Brenda Aynsley, is in itself symptomatic of the dangers that the committee represents to the future of the Internet. There is a huge danger in policy being made by a group of people who, however astute they may be as politicians, know nothing

about the nature and scope of the medium, she said.

Restrictive measures recommended in the committee's report include enlisting ISPs as Internet police, the creation of state and territory laws policing content, and \$100,000 fines for breaches of the proposed Code of Practice. ISPs that agree to police content would be indemnified against the fines.

Intellectual property lawyer Patrick Fair noted that some of the recommendations, such as the establish-

Continued on page 20



NewsRoundup

- It's been a mixed month for Microsoft, at least in Web terms.

Problems with access to its Web site due to an upgrading of server technology were exacerbated when the site was brought down by hackers not once, but twice. The first problem was caused by a user checking to see if a problem in Microsoft's Internet Information Server was widespread; the second was a more concerted denial-

of-service attack which was quickly labelled the 'Ping of Death' by online media. As well, Sun is claiming that a faulty implementation of TCP/IP by Microsoft means that Windows clients accessing Solaris servers can experience slowdowns. Microsoft has denied the allegations. In a final piece of Microsoft news, former Australian managing director Chris Kelliher will not be taking up an executive posting in the US, as previously announced when he left his position.

- Telstra Big Pond also suffered an embarrassing outage which left 70,000 subscribers without email over a weekend in early June. Users affected by the problem, which was attributed by some parties to a fault in Windows NT Server, will be compensated with credits to their accounts to cover lost mail and access time. This is a "goodwill gesture" according to the business manager of Big Pond Home, Dean Gingell. How terribly generous.

ActiveX: The big MS flop

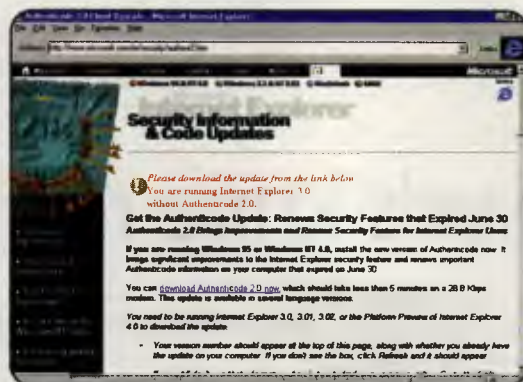
Continued from page 19

used Java, just 1,000 used ActiveX. A media-type search by the HotBot search engine identified 30,000 pages using ActiveX and more than 225,000 using Java. Most analysts pointed to the lack of cross-platform support for ActiveX and confusion over its standardisation process as key problems for the system.

However, one determinant of ActiveX's success on Australian Web sites may be even simpler: many Australian developers aren't able to register with VeriSign because it only accepts individual applications from residents of the US and Canada.

Perth developer Brad Evans found out about this little-known policy the hard way in May, when he wrote to VeriSign seeking certification under the Authenticode system for some ActiveX code he had written. VeriSign promptly replied that this would not be possible, since having code certified requires a class 2 individual or class 3 group certificate. The former are not available outside the US and Canada, while the latter are only available to companies.

Java imposes no such restrictions on developers because it relies on a 'sandbox' security model which aims to minimise the damage a rogue or unauthorised applet can cause. As a result,



Evans switched to Java development.

The reply to Evans included the following explanation for the anomaly: "To issue our class 2 individual certificates, we need to hook up to online consumer credit databases . . . Europe, Asia and many other areas of the world restrict the commercial use of such data, so we have not been able to roll out this service worldwide." VeriSign is planning to introduce a system for international registration later this year, but has not yet specified details or a time frame.

When Microsoft launched the Authenticode system locally in August last year, John Wood, then director of Microsoft's Internet customer unit, commented: "The development of Authenticode reflects Microsoft's commitment to creating open and interoperable security technologies for the Internet community." VeriSign's policy means that potential Aus-

Microsoft is encouraging users to upgrade their security on ActiveX controls, but the technology itself has landed with a thud.

tralian ActiveX developers are effectively excluded from that particular community.

The impact of the decision is apparent if the same HotBot media search is repeated on sites within Australia. According to HotBot, in early July there were more than 3,700 '.au' sites that included Java code, but fewer than 300 that included ActiveX controls. Search engine ANZWERS located more than 10,000 local pages using Java.

Microsoft has begun hedging its bets over Java, introducing into recent betas of Internet Explorer a feature known as JDirect, which allows Java applications to directly address the Windows API. This means that Java applications can effectively make use of all Windows functions, but at the cost of not being able to run on any other platform.

Local Microsoft representatives did not return repeated calls seeking comment.

Angus Kidman

Censor's knife

Continued from page 19

ment of an Australian Broadcasting Authority-like regulatory body, made sense, but questioned the proposed \$100,000 fine for breaches of the code of practice. "This depends on what the code contains, but it is hard to see what could be so bad as to lead to such a high fine that could not be dealt with by specific legislation," he told APC.

Fair was also cautious on the issue of indemnity for ISPs that choose to monitor and restrict the content they transmit. "It is an interesting incentive," he said. "But there must be certainty as to what the ISPs must block to gain the benefit, and a realisation that it is not practical to block types of material without an elaborate system of tagging."

Electronic Frontiers Australia chairperson Kimberley Heitman decried the committee's apparent lack of understanding that the Internet is a global medium, not a regional one.

While Internet industry bodies are preparing to fight the report, and hope that the US decision will provide a precedent, there's unease about the future under such prescriptive measures. "We have a horror of the spectre of the Singapore model looming large now and then, and this is one of those now and then," Aynsley said.

Helen Dancer



News Roundup

- Publishing and Broadcasting Ltd (publisher of APC and numerous other magazines as well as owner of Channel 9) and Microsoft have announced a joint online venture to provide Internet entertainment channels using the proprietary Microsoft Network (MSN). Based on PBL magazines and TV shows, as well as MSN content, it will provide chat groups, news, current affairs and

sport for MSN members. Details of the project are still extremely sketchy, but the company hopes to begin creating content within the venture this month. APC remains committed to retaining its own free, independent Web presence at <http://apcmag.com>.

- Leading local accounting systems firm Solution 6 has announced plans to acquire privately-held enterprise accounting specialist Computer Automated Business Systems (CABS). The joining of the two firms

will create a \$78 million firm with more than 550 employees that company executives hope will come to dominate the world accounting scene. "This represents an opportunity for us to really capture the world leadership position as a global supplier," CEO Chris Tyler said.

- Latest unsurprising Net statistic: Web servers are going to be big. IDC estimates that sales of Internet server products will rise from 637,000 units in 1996 to 2.1 million units by 2001.

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HARRADINE'S TURNAROUND

Senate scraps computer bounty

The Federal Government has abolished the computer bounty, reversing a pre-election commitment to maintain it until 2000. The bounty was a subsidy available to local hardware manufacturers to offset the tariffs on imported parts and promote industry, at an estimated cost of \$50 million a year.

The Bounty (Computer) Act 1984 provided 8% of manufacturing costs for local manufacturers to offset the costs of 5% tariffs on most imported components used in the manufacture of IT equipment, allowing them to compete on price with overseas companies. On June 27 the Senate voted in favour of the Federal Government's proposal to end the bounty, part of the Bounty Legislation Amendment Bill.

This was a reversal of its decision a week earlier to keep the bounty. When the bill was reintroduced to the Senate, independent Tasmanian Senator Brian Harradine changed his stance and voted in favour of it, leading to the bounty's abolition.

The Australian Information Industry Association (AIIA) has called Harradine's

turnaround a "shabby political deal" made to ensure the continuation of the government's shipbuilding bounty, which is more important to Harradine's home state. According to Harradine himself, there was no ambiguity. "The government made it very clear that the shipbuilding and computer bounty issues were interlinked — and that only one bounty would be supported," he told APC.

He said the computer bounty allowed an "uncompetitive" IT industry to be supported by consumers. "Australians feel the computer industry should operate in a reasonably competitive atmosphere so that they themselves don't face serious financial burdens."

The fairness of that assertion will be tested later this year when the Federal Government's own Information Industries Taskforce (IIT), headed by Professor Ashley Goldsworthy, will release a 'balance sheet' for the Australian information technology and telecommunications industry, as well as recommendations on whether and in what form the IT industries might require industry assistance.

Dominique Jackson

STOCK MARKET EMBRACES IT

New floats in favour

After the stock market frenzy following Netscape's initial public offering (IPO) in 1995, investors and analysts pulled back, concerned that the stratospheric stock prices weren't true reflections of many companies' worth. However, the recent successful float of Internet book retailer Amazon.com could indicate the market is again ready to take a gamble on the Internet.

"Financial analysis is based on past history and performance, but the dynamics of the IT industries are different, with many high-profile companies having relatively short histories yet strong performance," META Group program director Mo Marburg said.

Power Computing, the fastest growing Macintosh clone maker, with revenues of \$131 million in 1996, is also poised to make an IPO, using it as a means of jump-starting its attack on the Wintel PC and server market. An IPO may provide a solution to companies looking to increase capitalisation and profile, but others, like Digital's AltaVista

subsidiary, have cancelled floats.

The financially troubled Digital was planning to spin AltaVista off in a \$US50 million float this year but abruptly cancelled the plan, opting instead to integrate the company into its own Internet product group. A Digital spokesperson said AltaVista has the potential to be a "key differentiator for the company".

Josh Gliddon



Amazon (pictured) was seen as a bellwether for market confidence. Despite its high profile, the company has yet to make a profit, and also faces stiff competition as traditional retailers move online. Despite these pressures, its stock price closed 30% higher on the day of the offering, leaving the company with a \$US\$4 million war chest and a market capitalisation of \$US438 million.

employee at Sun should have a \$500 dollar computer on their desk," said McNealy during a keynote address at Netscape DevCon in Silicon Valley. Of more concern to Oracle's existing user base is the omission of key features in Oracle 8, including object support.

● The International Telecommunications Union (ITU) has released its latest Asia-Pacific Telecommunications Indicator, which highlights the growth of telephone lines in the region. The growth has sur-

passed every other region of the world since 1990. Teledensity is still well below other regions, however. The region is the world's fastest growing telecommunications market.

For regular updates on what's happening in the world of computing, go to APC's Highlights from the Wire every Monday at <http://apcmag.com>, as well as our breaking news stories throughout the week.



News Roundup

● Oracle has finally released its long-awaited Oracle 8 database, but even its launch couldn't stop Larry Ellison grabbing yet another opportunity to promote his vision of the NC-driven future. One becoming-less-than-impressed supporter of the concept is Sun CEO Scott McNealy, who has questioned the wisdom of promoting the original purchase cost of NCs. "It's insulting to suggest any

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NO DICE UNTIL Q3

NetPCs fail to excite

June's PC Expo in New York was supposed to mark the grand coming out of the NetPC, but delays in release and a lack of buyer interest in the products may doom the concept before it gets off the ground.

The NetPC made its official debut on June 16, but machines aren't expected to be widely available in the US until the third quarter or Australia until October. As previously reported in APC (see May, page 24) few local vendors have finalised their plans for releasing NetPC systems.

Microsoft and Intel have both staunchly defended the NetPC concept against criticism by corporate buyers and analysts. However, even Intel officials admit that NetPCs on their own won't deliver automatic reductions in cost of ownership. "Unless you're implementing procedures and processes, you're not going to get the benefit," Intel Australia general manager David Bolt told APC.

Angus Kidman

SERVER ACQUISITIONS

PCs attack the enterprise

With tightening margins and increased competition for conventional desktop systems, PC vendors are increasingly turning to the enterprise market to boost their fortunes. Most recently, Compaq has splashed out \$US3 billion to purchase high-end systems vendor Tandem, while Gateway 2000 has acquired Advanced Logic Research (ALR) for \$US194 million.

Compaq has had a long-stated ambition to transform itself from a PC vendor to a large-scale computer company with a complete range, in the style of IBM, Digital and Hewlett-Packard. However, the Tandem acquisition represents its first serious move into a non-PC product arena.

Tandem's core markets include high-volume transaction processing and messaging systems, which are not areas Compaq has traditionally competed in. As well, the



Compaq hopes a serving of Tandem will improve its scalability story.



Tandem acquisition has virtually doubled Compaq's staff numbers. CEO Eckhard Pfeiffer estimates that the complete Compaq/Tandem range of products will control a substantial share of a potential \$US650 billion market.

Compaq is expected to combine technologies from itself and Tandem in order to pursue the extension of Win-

dows NT into the enterprise. The companies both endorsed the Virtual Interface Clustering Architecture earlier this year.

While Gateway 2000's acquisition of ALR — best known recently for its multi-processing server lines — doesn't represent the same major extension out of the PC market space, company officials have clearly flagged it as a bid to improve Gateway's corporate appeal.

"The new relationship gives Gateway immediate access to established server technology, a key component of the growth strategy for our enterprise line," CEO Ted Waitt said following the acquisition.

As recently reported in APC (see June, page 22), PC vendors are increasingly looking to enterprise-related activities such as leasing to maintain their profitability.

While most analysts welcomed the two newest deals, it's noteworthy that both the Tandem and ALR brand names will be retained by their new owners, suggesting that PC firms recognise that corporate recognition is hard-won and not to be readily traded off for uniformity in branding.

Angus Kidman

BUYOUTS AND WALKOUTS

Local ISPs regroup

As Australia begins to grapple with a deregulated telecommunications environment, Internet service providers (ISPs) are seeing major changes and an increasing push towards market rationalisation.

Partnerships and cost-cutting are the new order of the day for ISPs. Microplex is pursuing a strategy of growth through acquisition, having acquired Pegasus and AUSNet. AUSNet will continue as a technology-development company.

Corporate provider Access One is also feeling the pinch,

with major staff turnovers and rumours of failed attempts to merge with other ISPs. However, Solution 6, the accounting software firm that owns Access One, says it is still committed to the company.

Even market-leading ISP OzEmail is not exempt from the trend. The company recently sold 40% of its nascent OzEmail Phone service (which uses the Internet as a connection medium) to German firm Metro AG.

Ironically, ISPs are facing increased regulation in the deregulated environment. From July 1, providers will be

regulated by the Telecommunications Industry Ombudsman. "The concept of dispute resolution, and the concept that a customer [who] has a dispute satisfactorily resolved will probably stick with them, is a new one for many ISPs," Ombudsman John Pinnock said.

And behind all this individual activity, an omnipresent threat lurks: Telstra. Figures from research firm www.consult suggest that of every dollar spent on the Internet in Australia, 75 cents goes straight back to Telstra.

Angus Kidman & Josh Gliddon

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WEB SCRIPTING

ECMA pushes new standard

A genuine standard for Web scripting is inching closer, with the European Computer Manufacturers Association (ECMA) producing a new standard, ECMAScript, that has been embraced by previous scripting rivals Netscape and Microsoft.

ECMAScript (formally known as ECMA-262) is based in large part on Netscape's JavaScript technology but includes some enhancements and bug fixes. It will be presented to the International Standards Organization later this year.

Both companies plan to comply with the basic ECMAScript specification. Version 3.0 of JScript, which Microsoft plans to implement in Internet Explorer 4.0 and Internet Information 4.0 (both currently in beta), follows the standard, and Netscape plans to make minor alterations to Javascript to conform to ECMAScript in its SuiteSpot and Communicator products in future releases.

APC Staff

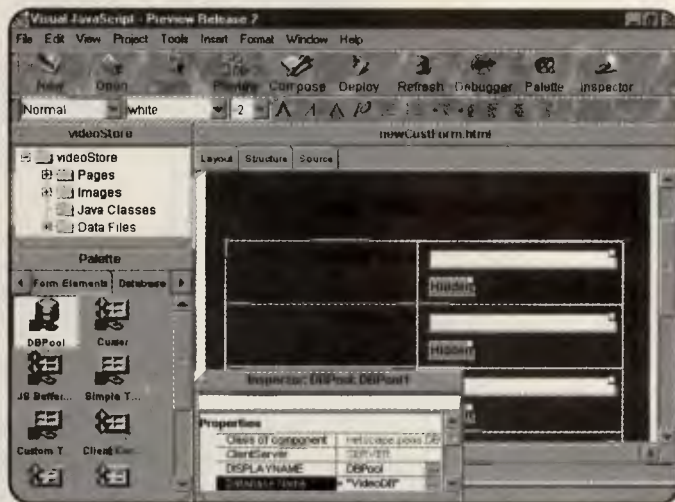
BEAN THERE, ONE THAT

Netscape preaches crossware

Netscape Communications used its third developers conference in Silicon Valley to evangelise a vision of Web-based applications it calls crossware. The company released a new technology blueprint and adopted JavaBeans as centrepiece of the crossware strategy, although the concept itself remains loosely defined.

"Crossware describes on-demand applications that run across networks and operating systems and can be easily extended to external partners and customers," chief technology officer Marc Andreessen wrote in a defining white paper.

Netscape believes enterprise developers will construct crossware applications that can be freely deployed to intranets, extranet partners and the public Internet. Engineered from the ground up to accommodate heterogeneous client and server platforms, crossware applications extend the Web paradigm to any MIS task.



"Traditional models like host computing and client/server don't really scale to the Internet," said Andreessen.

JavaBeans, Sun's Java-based component framework, will become the key building blocks for crossware built on Netscape's Open Network Environment (ONE) platform, the company announced at DevCon. Netscape will rewrite all its server and client soft-

ware as JavaBeans during 1998, with messaging, directory and database services in SuiteSpot 3.0 already formalised as JavaBeans.

Netscape previewed some appealing new software tools at DevCon, including Visual JavaScript, a graphical tool for assembling JavaBeans into functioning HTML-based applications.

Dan Tebbutt

BIG SALE FOR LOTUS

Stockdale's MS licensing swipe

Despite the fact that he flew to the US as a guest of Microsoft for the company's heavily publicised CEO dinner earlier this year, it seems Victorian Treasurer and Minister for Multimedia Alan Stockdale has yet to succumb to the peculiar charms of Redmond.

The trip was widely perceived as a last-ditch measure to prevent the Victorian government signing a statewide contract to install Lotus's Domino groupware, and to get it to favour a solution based around Microsoft Exchange. If that was the intention, it did-

n't work: in late June, Lotus officially announced its biggest-ever local sale of 30,000 seats, as part of the Victoria 21 strategy.

Stockdale also has reservations about a statewide licence for Microsoft products negotiated by the Victorian Department of Education. "It's very easy to succeed if you've got a statewide licence and a virtual monopoly. I don't think that's in the long-run interest of the users," he said recently.

Addressing the Victorian branch of the Australian Information Industries Association, Stockdale said "a conservative

attitude" among publishers towards revenue streams is bringing about a risk "that we will have monopoly positions conferred by governments anointing particular suppliers. Our education department, for example, negotiates whole-of-government, whole-of-state licences with particular software and particular content [providers]. I think, in the end, that is undesirable."

Stockdale believes that online content delivery coupled with a micropayment system would allow more open competition. "[E]very time a school clicks onto a site to use

the multimedia content on that site, or every time a kid at home accesses it for homework purposes, they toll up a small charge.

Under such a scheme, "the people who get the business will be the ones who are recognised by — in this case — schools, teachers, students and parents as having developed the best content, and that'll put real pressure on people to really use the medium to develop genuinely interactive, genuinely multimedia content instead of just putting textbooks on the Internet."

Stephen Withers



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How effective is the Internet for public information dissemination, and just how useful does the government want it to be?

Missed opportunities online

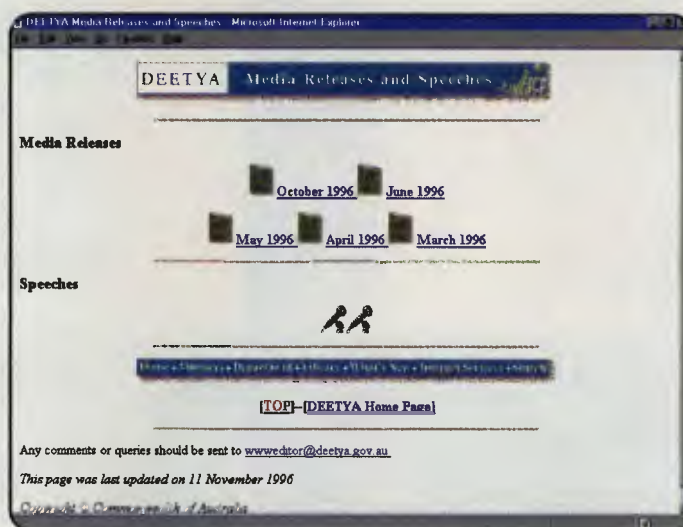
The Human Rights and Equal Opportunity Commission (HREOC) finished its report into the stolen Aboriginal generations in early April. Even before the government publicly released *Bringing them home*, it condemned the report's findings, leading to a flurry of news reports and discussion. When it was tabled in Parliament seven weeks later, there was a rush for copies. The Australian Government Publishing Service (AGPS) received a higher-than-expected number of requests for the 700-page, \$60 report, and within a week it was out of print.

Under such circumstances, making the report available through the Web may have helped meet demand for it, especially from overseas. However, the report was not made available online and those who wanted a copy had to wait for a reprint. Producing an online version is relatively easy, so why wasn't it done?

No-one seems keen to take responsibility. The AGPS said it wasn't its problem, while a spokesperson for the Minister for Aboriginal Affairs said the portfolio wasn't even "hooked into" the Internet and that it was up to HREOC to make such publishing decisions anyway. HREOC in turn said an online summary would be available "soon", but there were no plans for the electronic publication of the full report, which was too expensive to create.

Some weeks later, a summary was available online and the reprinted edition was selling well. It now appears the full report will be available online at some stage, but through the AUSTLII legal information site. According to a HREOC spokesperson, the commission had been forced to wait for an organisation to offer to put it online for it. The spokesperson added that the government required reports be tabled in hard copy format, and that it was the type of report that would be better held and read, not read from a computer screen. If you accept these justifications, the decision to publish online at all appears bizarre.

However, it's not as strange as the government's muddle-headed stance on utilising Internet resources overall. While some federal departments have Web sites with extended public information resources, others have not been ade-



Key information on this government site has not been updated since November last year.

quately updated for months. APC also found that members of particular departments were ignorant of the Net services their department provides and the publishing systems available to them. While some government reports seem to have a delayed Net release, or none at all, others are quickly made available online.

It could be a case of one hand not knowing what the other is doing. The AGPS gave APC several conflicting reports on its role in the online publishing process. The AGPS plays no part in each department's decision on whether to publish its individual reports online. However, it is not the case, as outlined initially to APC, that it does not offer such a service.

In fact, the AGPS has had a commercial electronic publishing section for a number of years. APC was told after three separate conversations with the government body. When asked, it will provide quotes for the cost of its electronic distribution services. These include Web site maintenance, CD production and online publication.

The service relies on word of mouth for business. Considering the apparent lack of awareness of its existence even within the AGPS, this could be a real problem. The Internet is still an untapped, under-used resource, if the reactions of staff and the tardiness of departments to update their sites are any indication. A few weeks after APC was told that the Minister for Aboriginal and Torres Strait Islander Affairs had no Web site for his portfolio, we were

informed (by another representative) that there is in fact a Web site. It is run by the Aboriginal and Torres Strait Islander Commission, the statutory authority which acts as the minister's department.

At the time of writing, all but one of the 18 Commonwealth government departments had a Web presence. The slow-to-move Attorney General's Department was in the process of developing its site. Only two of the sites were completely up to date (updated on the day they were accessed). A few had been updated the week before, and more in the past month.

The worst departmental offender was Employment, Education, Training and Youth Affairs. Its public information (media releases and speeches) had not been touched since November last year.

Perhaps most telling in this respect is the fact that the statements section of Prime Minister John Howard's site had not been updated for 11 days. During that period he had been travelling overseas making speeches and meeting heads of state with an entourage of journalists, presumably seeking international and national coverage for his efforts. When in the US John Howard visited Geelong-born Yankees' pitcher Graeme Lloyd at a baseball match, reportedly stating that it would be a dereliction of his duty as Prime Minister if he didn't attend such events. What about his government's duty to inform the public?

Selina Mitchell

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The digital revolution in film production has turned back 90°.

Back from the cutting-room floor

In March this year, alien special-effects B-movie extravaganza 'Independence Day' picked up an Oscar for best achievement in visual effects. After the awards ceremony, the men responsible — Volker Engel, Douglas Smith, Clay Pinney and Joseph Viskocil — didn't try to claim that the cliché-ridden gore-fest was actually a good film. Instead, they took the opportunity to decry the use of computer technology in the special-effects process. "[Making models is] way more fun than just sitting in front of a computer," the group told reporters following their win. "New technology will never replace old technology. If it was good enough for them in the old days, it's good enough for us."

The remarks have a deeper resonance in the world of film production. Rapid advances in digital editing technology have led many to predict that filmmaking will eventually become an entirely digital process. The truth is a little more complicated. While few in the film industry disagree that digital editing technologies have marked a fundamental change in the way films are created, their effect in many cases has been to complement rather than supersede previous manual systems.

Stephen Smith, the managing director of editing facility Frameworks, has seen the trend emerge. Frameworks, which is based in Sydney, was set up five years ago as an exclusively digital editing shop. Movies that have been worked on at the facility include 'Babe', 'Dating The Enemy', 'Idiot Box' and the forthcoming film for toddler superstars The Wiggles. Without exception, digital editing has been a fundamental part of the process in creating these films.

According to Smith, "very few" films made anywhere in the world now avoid the digital phase entirely. "We've been editing film the same way for 100 years. This is a fundamental change," he told APC. Much of the advantage centres on time and ultimate cost: digital editing can reduce the typical production cycle on a film from around 20 weeks to as little as 12 weeks, according to Smith. Even though this may result in shortened employment for freelance editors, they have embraced

the system. "Even though they won't be on the film as long, the advantages were so great," he said.

However, because the final product of filmmaking still exists in an analog medium, traditional editing systems are unlikely to disappear any time soon. Smith illustrated the point by recounting



how he first began trying to convince producers to use the digital editing facility.

"When you try to develop new technology, you try to find the point of least resistance," he said. For producers, that was initially the budget; because editing digitally eliminates the need for multiple work prints, so film development costs drop dramatically. In the early years of Frameworks' operation, this was a major selling point, Smith said.

However, from a creative point of view, work prints are still very useful; they provide a degree of resolution that's still hard to achieve in conventional systems, making it easier to check details of performance and lighting. As a result, productions have increasingly chosen to work with a mixture of digital editing and more conventional approaches. That decision has been abetted by a reduction in processing costs from film laboratories, which recognised that the alternative was to see work dry up altogether.

The end result is that the cost gains from digital editing have flattened a little as work prints have returned, but there has been a greater gain in terms of flexibility of approach. Editors can use both

digital and conventional systems as appropriate. Reflecting that switch, the Frameworks facility now features traditional flatbed editors as well, so that all editing can be completed in a single environment.

Nonetheless, new technologies continue to affect the making of movies. The most recent innovations have been in the area of information sharing. Once large portions of a film have been digitised, one new challenge that emerges is sharing that information effectively over a large production team which may well be working in multiple locations across different countries.

Telecommunications companies have been quick to see the possibilities. British Telecom and MCI plan to launch a service later this year to provide dedicated links between Los Angeles and the UK (which remains a popular shooting location for many big-budget US films). The technology has already been trialled on the latest James Bond film, 'Tomorrow Never Dies', currently in production in London.

Traditional editing houses are also embracing the challenge of digital information sharing. Editing on the film 'Dark City' (a big-budget production from 'Crow' director Alex Proyas) was carried out at Frameworks on an Avid MediaShare system, which allows two editors to work on a single set of files relating to the same production. The MediaShare uses a check-in/check-out system to avoid conflicts from both editors trying to work on the same footage.

The emergence of such systems represents a major shift from less than two years ago, when special-effects house Rhythm and Hues needed to send special effects from Los Angeles to Sydney for production of the movie 'Babe'. The film's producers were forced to improvise a solution using ISDN, a Silicon Graphics workstation and a Mac LCII (see APC January 1996, page 19).

Angus Kidman



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US Robotics Courier V. Everything and NetComm Roadster 56

The latest modem technology has been in the press since the beginning of the year. We have seen two competing technologies emerge, K56Flex from Rockwell and x2 from US Robotics/3Com. Until an ITU standard is announced, the two products will remain incompatible.

At the time of writing, K56Flex products were thin on the ground. US Robotics and NetComm are the first two companies off the mark in Australia, which may give them an advantage over the Rockwell camp.

ISP support is also crucial to the success of either standard. Some Australian ISPs such as Sprint Online are already offering x2 connections for their users, and the list of x2-committed ISPs includes Apollo Internet Services, Dragon Net E.Com and Global Communications. CompuServe and IBM Global Internet, both of which use a US Robotics central site solution, are also expected to offer x2 connections to customers. OzEmail has announced upcoming services for both x2 and K56Flex connections.

One important restriction on both flavours of 56K technology is that, while a user can receive data at up to the theoretical maximum of 56Kbps, sending data upstream is still restricted to 33.6Kbps. This makes 56Kbps services great for Web surfing and other activities with a high upload/download ratio, but less suitable for peer-to-peer connections.

For this review we tested both the Courier and the Roadster through a dial-up connection provided by OzEmail. While we were not able to formally test the two products using telecommunications equipment, usability testing proved

very satisfying. While it was nearly impossible to connect at the full 56Kbps, we did manage connections at between 44Kbps and 52Kbps, with an average of around 48Kbps. Surfing the Web and using remote access software at this speed was noticeably faster than using standard V.34 technology, and approached the download speeds of a 64Kbps ISDN link.

The Courier modem is a professional product and one of the best modems on the market today.

The front LED indicators are clearly laid out and there is a large and easily accessible voice/data switch on the front of the unit, which lets you switch between voice and data communications during a call. There is also a sliding volume control mounted on the side of the box.

Underneath the unit is a list of AT commands for easy reference. There is also a bank of dip switches that can be used to configure common options such as turning auto answer on and off. The Courier supports all the earlier ITU-T standards from V.34 and down and is also a Group 3, Class 1 and 2 capable fax.

Quick Connect and Adaptive Speed Leveling technology have been used by US Robotics. Quick Connect means that the Courier will connect to another modem and negotiate within around seven seconds. The Adaptive Speed Leveling technology compensates for line noise. If the line becomes noisy, the modem will drop down the speed to reduce errors until the noise clears, then return to the maximum-capable speed.

Users of older Courier modems can upgrade their modem to 56K with a free upgrade, which is downloadable from US Robotics' Australian Web site at <http://www.usr.com.au>.

NetComm has announced both x2 and K56Flex-based products, although the Roadster 56 x2 was the first that APC received. This voice modem is more of a consumer product than the Courier. It comes bundled with a headset/speaker phone and Cooe Electronic Secretary software. The Roadster also comes with Visual Eyes for Windows 95 so the user can turn the Roadster into a hands-free telephone; a headset is part of the package. It supports all of the Current ITU-T transmission standards and is a Class 1 and 2 capable fax modem. NetComm provides the Roadster 56 in both PC and Macintosh versions.

The good news is that both modems are software upgradable to the 56K ITU standard, which is expected to be announced at the end of this year.

Lachlan Botticchio



Courier V. Everything

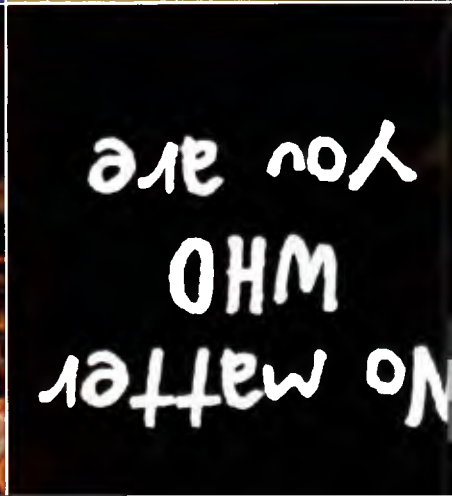
■ Distributor	3Com (US Robotics division)
■ Phone	(03) 9934 8888
■ Online	http://www.usr.com.au
■ Price	\$449
■ In short	A versatile professional product that is upgradable to future modem standards.

NetComm Roadster 56

■ Distributor	NetComm
■ Phone	(02) 9888 5533
■ Online	http://www.netcomm.com.au
■ Price	\$399
■ In short	Roadster 56 offers good consumer-oriented support for the 2 standard.

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capacities up to 6.4GB, and a huge standard 512K cache. You can store more data, run several applications at once and experience a level of performance that takes you to an all-time high in brighter, faster, more intense imagery.

Systems containing Pentium processors with MMX technology come standard with 2MB SDRAM for amazing 2D and 3D video performance, as well as a 4MB STB Virge graphics card to give you the ultimate video experience. Plus, the best in audio technology with the Ensoniq PCI Wavetable sound board which delivers 16 MIDI channels, 32-bit wavetable sound and up to 32 simultaneous voice polyphony!

Microsoft's Office 97 Small Business Edition is already installed and ready to run. You're also ready to communicate with the world via the Internet with the ultimate 33.6Kbit/s voice/fax/data modems pre-installed.





Gateway's Notebook PCs. More computing in more places.

Freedom to work wherever and whenever you want, without having to compromise on power or speed. That's what you can have with a Gateway Solo notebook PC because they have all the latest technology packaged in a stylish, lightweight case.

When we set out to develop our Solo notebooks, common modularity was high on our list of priorities. As a result, the Solo 2300 and 9100 notebooks share industry standard compatibility, including batteries, removable hard drives, AC adaptors, SDRAM memory modules as well as mini and full docking stations.

Solo 2100

The ideal workhorse notebook with a price that's as compact as the computer itself.

The Solo 2100 was our first notebook which we designed to give

you the flexibility and power for day to day tasks when you're away from the office or your home. It's a great starting point, and features an Intel 133MHz Pentium® processor and an 11.3 inch DSTN Passive Matrix SVGA colour display.

Solo 2100

Solo 2300

When you weigh up the performance and price of the Solo 2300, it's easy to see why it's so popular. You'll find it has the power, speed and flexibility to handle a huge range of functions.

Start with an Intel 133MHz Pentium processor or upgrade to a 166MHz Pentium® processor with MMX™ technology. The 12.1 inch SVGA active matrix colour display is backed by a 128-bit Neomagic NM2093 video accelerator and has integrated 16-bit sound with stereo speakers, stereo headphones, built-in microphone and line-in jacks.

Solo 9100

We've always known our Solo 9100 to be an awesome notebook. Now it's been confirmed. BYTE Magazine in the U.S. has judged the Solo 9100 as the Best Portable of the huge COMDEX/Spring '97 event!

The Solo 9100 has been designed to take advantage of the wealth of multimedia applications

coming onto the market. The 13.3 inch XGA screen is about as big as you can get in a notebook, supported by a huge 4MB EDO VRAM delivering 65,000 colours up to 1024 by 768 resolutions. There's fully integrated 16-bit sound with stereo speakers, stereo headphones along with built-in microphone and line-in jacks.

We're talking serious performance capabilities here. How about a modular combo 1.44MB 3.5 inch disk drive/10x average CD-ROM drive. For storage, you have a massive 3GB removable hard drive. That's almost double what you normally get, so feel free to take your entire desktop environment wherever you go with the Solo 9100.



Solo 2300



Solo 9100





WHEN
you need
to buy
a computer



Here's WHY you should call Gateway 2000.

To answer 'Why Gateway 2000?', we need to go back twelve years when two young computer buffs started making PCs for friends in a barn in South Dakota. They did such a brilliant job that it became a full-time business.

Now, Gateway is one of the biggest computer companies in the world, employing over 10,000 people. Gateway's turnover was more than



Choose your configuration.



Building your baby from scratch.

US\$5.04 billion last year and we shipped more than 1.9million PCs to customers around the world.

Our home-grown origins are still a strong part of our culture. Our vision is still to provide the very best personal computers direct to our customers.

Get a taste of Fresh technology.

If you're buying a computer, you want to know you're buying the latest technology. To bring you the latest technology at the best prices, we are continually building strong relationships with our component suppliers, to ensure we can bring you

the latest technology as soon as it becomes available.

As an example, when Intel released its MMX™ technology, we were amongst the first to make it available to our customers. When Intel announced Pentium II® processors to the world, we were shipping out PCs with Pentium II processors the same day. You can't get fresher than that!

Build your baby to order.

One of the reasons we react so quickly to new technology is our built-to-order philosophy. If the technology's out there, you can be sure that we

have it and can build it into your PC.

Built-to-order means you get to choose what you want and we build it from scratch to your requested configuration. Then we deliver direct to your door.

Our commitment to our customers extends way beyond the standard three year parts and labour warranty. We also have service support for your computer and its operating system, which lets you access toll-free technical advice for the life of your system.

it costs less to talk direct.

At Gateway, we like dealing with our customers directly. So forget middlemen, you'll be talking to Gateway people right from the start. This keeps the costs down and avoids the inherent problems of



At home on the silicon prairie. working through a line of distributors and agents. It lets us have a closer relationship with you. We can get to know you better and understand what you want in your PC. Talk to us over the phone or visit one of our showrooms in Sydney, Melbourne or Brisbane.

Tech talk on <http://gw2k.com.au>

Go shopping for your dream PC with the Gateway Configurator on the Internet. Play around with different configurations, get a price, tweak it to suit your wallet, explore options and, when you've found your perfect match, place your order. Plus there's a bucket load of information about the latest and greatest in computer technology developments.



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Gateway 2000 E-Series Systems

GATEWAY E-1000

Features include:

- Intel Pentium® 166 MHz Processor
- Low Profile, LPX Desktop Case
- Support for 256MB SDRAM Memory
- 256K L2 Pipelined Burst Cache
- Integrated 2MB S3 Trio 64 V+ Graphics
- 15" Crystal Scan Monitor
- 17" Crystal Scan Monitor
- 17" Vivitron Monitor
- 21" Vivitron Monitor
- 1.2 GB Hard Drive
- Integrated 10/100 Mbit/s Network Card
- Intel LANDesk Client v3.01
- DMI Compliant
- Integrated Management ASK
- Operating System: Windows 95, Dos 6.22/Win 3.11, NT4.0

Starting from **\$1699** inc Tax

GATEWAY E-3000

Features include:

- Intel Pentium® 200 MHz Processor
- Intel Pentium 166,200 MHz Processors with MMX Technology
- Desktop, Mini Tower, ATX Tower Cases
- Support for 256MB SDRAM Memory
- 512K L2 Pipeline Burst Cache
- Integrated ATI Rage II + Video w/2MB SDRAM Graphics
- 1.6GB Ultra ATA Hard Drive
- 3.2GB Ultra ATA Hard Drive
- 6.4GB Ultra ATA Hard Drive
- 4GB, 9GB Ultra Wide SCSI and Controller
- 15" Crystal Scan Monitor
- 17" Crystal Scan Monitor
- 17" Vivitron Monitor
- 21" Vivitron Monitor
- Intel LANDesk Client v3.01
- DMI Compliant
- Integrated Management ASK
- Operating System: Windows 95, Dos 6.22/Win 3.11, NT4.0

Starting from **\$1999** inc Tax

GATEWAY E-3100

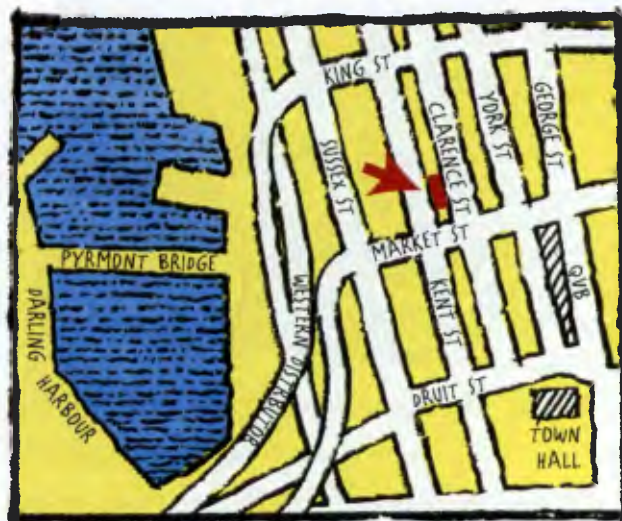
Features include:

- Intel Pentium® 233,266 MHz Pentium II Processors
- Desktop, Mini Tower, ATX Tower Cases
- Memory Expandable to 256Mb EDO
- 512K L2 Pipeline Burst Cache
- 4MB STB Virge GX EDO DRAM PCI Graphics Accelerator
- 4MB Matrox Millennium WRAM
- 8MB STB Virge VX EDO DRAM PCI
- 1.6GB Ultra ATA Hard Drive
- 3.2GB Ultra ATA Hard Drive
- 6.4GB Ultra ATA Hard Drive
- 4GB, 9GB Ultra Wide SCSI and Controller
- Min 12x/16x IDE CD-ROM
- Min 12x/24x IDE CD-ROM
- 12x SCSI CD-ROM
- 15" Crystal Scan Monitor
- 17" Crystal Scan Monitor
- 17" Vivitron Monitor
- 21" Vivitron Monitor
- Intel LANDesk Client v3.01
- DMI Compliant
- Integrated Management ASK
- Operating System: Windows 95, Dos 6.22/Win 3.11, NT4.0

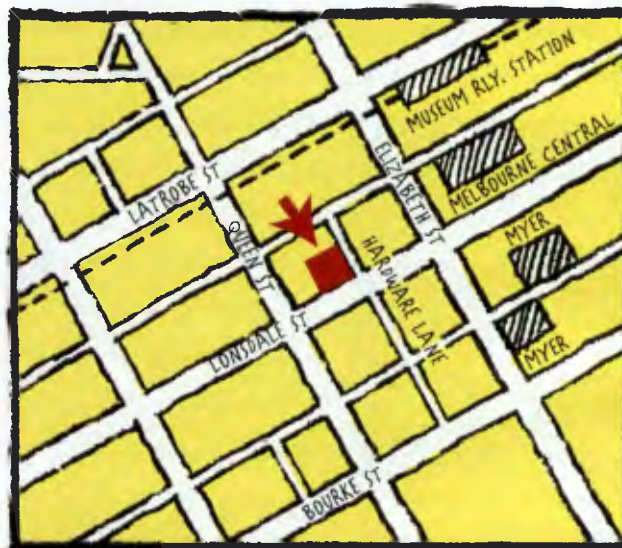
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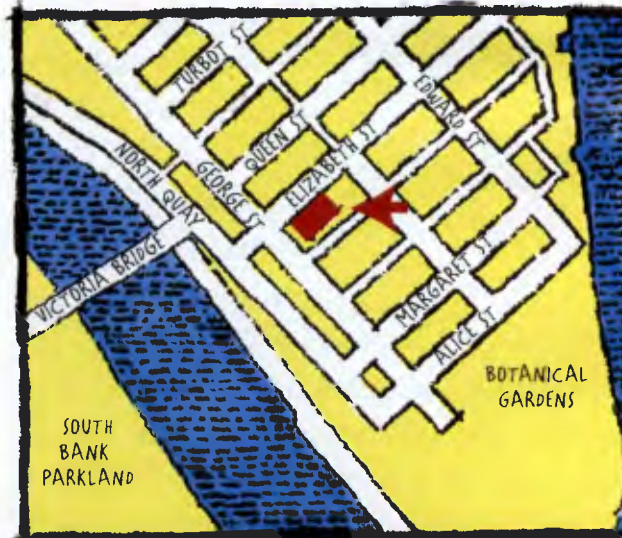
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Melbourne Showroom: 398 Lonsdale St. Melbourne



Brisbane Showroom: Shop 3, 47-79 Elizabeth St. Brisbane

Business Hours: Mon-Fri, 9.30am-6.00pm Sat, 9.00am-5.00pm

Gateway's E-Series. New business solutions for networked environments.

When our corporate, government and education customers started requesting configurations specific to their networked environments, we stopped and listened. We listened hard and used their input to design a system which has the tools and power for corporate computing.

The result is our new major accounts product line, the E-Series, designed to meet corporate computing needs.



E-3000 Series

We can promise you:

- **RELIABILITY.** Our E-Series is based on best of breed components, which are backed with extensive testing and certification.
- **STABILITY.** Our base components are held stable over time. The E-Series is designed for easy upgradability, and managed product transitions to suit individual businesses.
- **MANAGEABILITY.** Intel's LANDesk® Client Manager and LM78 Management ASIC are pre-installed, and every system is DMI 1.1 compliant.
- **SERVICEABILITY.** Downtime is minimised thanks to easy access cases, colour coded back plans, remote location servicing and wake-on LAN in the E-1000.

These cost savers add to Gateway's unique Value of Ownership equation.

Simply, Value of Ownership is the combination of maximised benefits to your business and reduced costs over the life cycle of your system. It's all about getting the right balance of quality, performance, manageability, service and life cycle cost.



E-3100 Series

E-3100 Series

For higher performance, Gateway's E-3100 systems have the latest power enriched Pentium II processors, designed for 32 bit operating environments like Windows NT Workstation 4.0. They're ideal for more demanding applications, such as desktop publishing and computer aided design.

The Intel 440FX chipset has EDO memory support, and Ultra ATA hard drives are standard.

E-3000 Series

A no-nonsense solution to general business computing is the E-3000 series which comprises a wide range of systems based on Intel's Pentium processors and Pentium processors with MMX technology. It's an all-round flexible, cost efficient solution, within a compact space-saving desktop case.

The latest Intel 430TX chipset provides superior performance supporting SDRAM memory and Ultra ATA hard drives which provide higher data transfer rates between memory and disk drives

E-1000 Series

The new E-1000N increases the flexibility and versatility of Gateway's E-1000 range, delivering a low cost, stable solution for high volume network environments. The E-1000N is based on Gateway's E-1000 platform with additional modifications which further increase manageability and lower network costs.

The dual-mode approach of the E-1000 platform allows you to deploy the E-1000N as a Net PC alongside fully featured E-1000 PCs to suit each user's needs. At the same time, you benefit from common architecture, common components and the flexibility to adapt your network infrastructure to evolve with future needs.



GATEWAY GP5-200

- Intel® 200MHz Pentium® Processor
- 16MB SDRAM Memory
- 512K Pipelined Burst Cache
- 1.6GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 2MB ATI SGRAM 3D Graphics Accelerator
- 15" NI SVGA Digital Colour Monitor
- ATX Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft® Mouse
- Microsoft Windows 95

\$1899 inc Tax

Gateway G5-166P SE - Intel 166MHz Pentium® Processor with MMX™ Technology \$1999 inc Tax

GATEWAY GP5-200 SE

- Intel 200MHz Pentium® Processor with MMX™ Technology
- 16MB SDRAM Memory
- 512K Pipelined Burst Cache
- 1.6GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 2MB ATI SGRAM 3D Graphics Accelerator
- 15" NI SVGA Digital Colour Monitor
- Min 12x/Max 16x CD-ROM Drive
- ATX Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft Mouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition +

\$2499 inc Tax

GATEWAY GP6-233

- Intel 233MHz Pentium® II Processor
- 32MB EDO Memory
- 512K L2 Integrated Cache
- 3.2GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 4MB STB Virge GX EDO DRAM PCI Graphics Accelerator
- 15" NI SVGA Digital Colour Monitor
- Min 12x/Max 24x CD-ROM Drive
- ATX Minitower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition +

\$3399 inc Tax

GATEWAY GP6-266

- Intel 266MHz Pentium® II Processor
- 64MB EDO Memory
- 512K L2 Integrated Cache
- 3.2GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 4MB STB Virge GX EDO DRAM PCI Graphics Accelerator
- 17" NI SVGA Digital Colour Monitor
- Min 12x/Max 24x CD-ROM Drive
- ATX Minitower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition +

\$4299 inc Tax

Gateway 2000 G-series - Multimedia Systems

GATEWAY G5-166m

- Intel 166MHz Pentium® Processor
- 16MB SDRAM Memory
- 512K Pipelined Burst Cache
- 1.6GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 2MB ATI SGRAM 3D Graphics Accelerator
- 15" NI SVGA Digital Colour Monitor
- Min 12x/Max 16x CD-ROM Drive
- Ensoniq PCI Wavetable Audio
- Altec™ Lansing Performance Amplified Speakers
- ATX Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft Mouse
- 33.6 Kbit/s Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 30 hours free access*
- Microsoft Windows 95
- MS Works
- Epson Colour Inkjet Printer

\$2499 inc Tax

GATEWAY G5-233m SE

- Intel 233MHz Pentium® Processor with MMX™ Technology
- 32MB SDRAM Memory
- 512K Pipelined Burst Cache
- 3.2GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- Zip™ Drive and 100MB Zip Disc
- 2MB ATI SGRAM 3D Graphics Accelerator
- 17" NI SVGA Digital Colour Monitor
- Min 12x/Max 16x CD-ROM Drive
- Ensoniq PCI Wavetable Audio
- Altec™ Lansing Dolby Surround Speakers with Subwoofer
- ATX Minitower Case
- 104-Key Windows 95 Keyboard
- Microsoft Mouse
- 33.6 Kbit/s Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit - with 30 hours free access*
- Microsoft Windows 95
- Microsoft Sidewinder 3D Pro Digital Joystick
- Gateway Select Software Pack
- MMX technology-enabled software
- MS Office 97, Small Business Edition +

\$3999 inc Tax

Gateway G5-200M SE - Intel 200MHz Pentium® Processor with MMX™ Technology, 15" Monitor and Altec™ Lansing Performance Amplified Speakers \$3299 inc Tax

GATEWAY G6-233M LS

- 233MHz Pentium® II Processor
- 32MB EDO Memory
- 512K L2 Integrated Cache
- 3.2GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- 4MB STB Virge GX EDO DRAM PCI Graphics Accelerator
- 17" NI SVGA Digital Colour Monitor
- Min 12x/Max 24x CD-ROM Drive
- Ensoniq PCI Wavetable Audio
- Altec™ Lansing Dolby Surround Speakers with Subwoofer
- ATX Minitower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- 33.6 Kbit/s Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 30 hours free access*
- Microsoft Windows 95
- Microsoft Sidewinder 3D Pro Digital Joystick
- Gateway Select Software Pack
- MMX technology-enabled software
- Microsoft Office 97, Small Business Edition +

\$4399 inc Tax

GATEWAY G6-266M LS

- Intel 266MHz Pentium® II Processor
- 64MB EDO Memory
- 512 L2 Integrated Cache
- 6.4GB Ultra ATA Hard Drive
- 1.44MB 3.5" Diskette Drive
- Zip Drive & 100MB Zip Disk
- 4MB STB Virge GX EDO DRAM PCI Graphics Accelerator
- 17" NI SVGA Digital Colour Monitor
- Min 12x/Max 24x CD-ROM Drive
- Ensoniq PCI Wavetable Audio
- Altec™ Lansing Dolby Surround Speakers with Subwoofer
- ATX Minitower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- 33.6 Kbit/s Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit - with 30 hours of free access*
- Microsoft Windows 95
- MMX technology-enabled software
- Microsoft Office 97, Small Business Edition +

\$5199 inc Tax

Gateway 2000 Solo Series - Portable Systems

GATEWAY SOLO 2100

- Intel 133MHz Pentium® Processor
- 16MB EDO RAM (expandable to 72MB)
- 256K Pipelined Burst Cache
- 1.4GB Removable Hard Drive
- Modular 1.44MB 3.5" Diskette Drive
- 1MB EDO Video RAM
- 11.3" DSTN Passive Matrix Colour Display
- NiMH Battery Pack & AC Pack
- PCMCIA Slots - 2 Type II or 1 Type III
- EZ Pad Pointing Device
- Integrated 16-Bit Sound with Stereo Speakers
- Stereo Headphone, Built-in Mic & Line-In Jacks
- Parallel, Serial, Infrared VGA & PS/2 Ports
- PCI Bus
- 85-Key MS Windows 95 Keypad
- Microsoft Windows 95
- Casual Carry Case

\$2799 inc Tax

GATEWAY SOLO 2300

- Intel 133MHz Pentium® Processor
- 16MB SDRAM (expandable to 192MB)
- 256K Pipelined Burst Cache
- 1.4GB Removable Hard Drive
- Modular 1.44MB 3.5" Diskette Drive
- Modular 10-Speed (Avg.) CD-ROM Drive
- 128 Bit Neomagic NM2093 Video Accelerator
- 12.1" SVGA Active Matrix Colour Display
- Lithium-Ion Battery Pack & AC Pack
- PCMCIA Slots - 2 Type II or 1 Type III
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Integrated 16-Bit Sound with Stereo Speakers
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB ports
- Card Bus
- 85-Key MS Windows 95 Keypad
- Microsoft Windows 95
- Casual Carry Case

\$4199 inc Tax

GATEWAY SOLO 2300 LS

- Intel 166MHz Pentium® Processor with MMX™ Technology
- 32MB SDRAM (expandable to 192MB)
- 256K Pipelined Burst Cache
- 2.1GB Removable Hard Drive
- Modular 1.44MB 3.5" Diskette Drive
- Modular 10-Speed (Avg.) CD-ROM Drive
- 128 Bit Neomagic NM2093 Video Accelerator
- 12.1" SVGA Active Matrix Colour Display
- Lithium-Ion Battery Pack & AC Pack
- PCMCIA Slots - 2 Type II or 1 Type III
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Integrated 16-Bit Sound with Stereo Speakers
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB ports
- Card Bus
- 85-Key MS Windows 95 Keypad
- Microsoft Windows 95
- MMX technology-enabled software
- Microsoft Office 97, Small Business Edition +
- Casual Carry Case

\$5499 inc Tax

Gateway Solo 2300 SE - Intel 150MHz Pentium® Processor with MMX™ Technology \$5299 inc Tax

GATEWAY SOLO 9100 XL

- Intel 166MHz Pentium® Processor with MMX™ Technology
- 64MB SDRAM (expandable to 192MB)
- 256K Pipelined Burst Cache
- 3.1GB Removable Hard Drive
- Modular Combo 10-Speed (Avg.) CD-ROM Drive & 1.44MB 3.5" Diskette Drive
- 4MB EDO Video RAM
- 13.3" SVGA Active Matrix Colour Display
- 33.6 Kbit/s Fax Modem and Software
- Telstra Big Pond Internet Kit with 30 hours free access*
- Lithium-Ion Battery Pack & AC Pack
- PCMCIA Slots - 2 Type II or 1 Type III
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Integrated 16-Bit Sound with Stereo Speakers
- Parallel, Serial, fast Infrared, PS/2, ext. Video USB, NTSC, Pal in/out, 15 Pin Game and Midi ports
- Card Bus
- 85-Key MS Windows 95 Keypad
- Microsoft Windows 95
- MMX technology-enabled software
- Microsoft Office 97, Small Business Edition +
- Deluxe Carry Case

\$7899 inc Tax



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It's not Rhapsody, but Mac OS 8 offers some new features to sate upgrade-starved Mac users.

Apple Mac OS 8

European hotels are superstitious about the number 13, but Apple's cursed number is eight, forever associated with the Copland debacle. Although it now has the enticing Rhapsody strategy, Apple's core platform is still Mac OS, so it decided to bring to market the successful elements of Copland.

The result is Mac OS 8, previously code-named Tempo. While not as significant as the leap from System 6 to 7, Mac OS 8 introduces many novel features that represent the most significant Mac modernisation since System 7.5. APC tested a pre-release beta.

Mac OS 8 gives the operating environment an aesthetic makeover, but under-the-hood advances provide the real value. The Mac UI boasts a new 3D-oriented style familiar to users of Aaron shareware. Folder icons and menus are restyled in 3D while numerous minor but useful UI changes are stacked up, including sticky menus that stay open automatically, a window-shade button, spring-loaded folders that jump open on cue and pop-up windows that reduce desktop clutter. Although short of Copland's full UI scalability, Mac OS 8 introduces SimpleFinder to help novice users with shorter, relevant menus.

The new multitasking, PowerPC-native Finder is a fundamental part of Mac OS 8. Its power provides the foundation for UI enhancements while increasing user productivity in very practical ways. For instance, multiple file copies can run simultaneously while emptying the Trash and launching an application. Some of this functionality was previously available in third-party utilities, but the OS-level support is very stable and a genuine time saver. Application launch speeds are about equal to those of Mac OS 7.6, but APC found Finder views sometimes slow. Performance is still greatly improved with the inclusion of Connectix SpeedDoubler utilities.

The Finder is greatly improved in Mac OS 8. Menus are reorganised along with new keyboard commands for common tasks like moving files to Trash. Aliases can now be created by dragging and dropping using the Command+Option keys. Most features work flawlessly but this beta still had rough edges.

Another debutant is the contextual menu. As with Windows 95's Properties, a pop-up list appears when clicking an item with the Control key held down. Menu



items vary according to circumstances, allowing users to get info, move to Trash, make aliases or find originals. Within folders, contextual menus control view options. Contextual menus also allow you to open a Web page, but this feature did not seem to work in our beta. After becoming attuned to the environment, we used contextual menus habitually, which strongly suggested Apple ought to embrace two-button mouse behaviour.

Folder arrangement is improved. System 7's clean-up functions are great but obscure: Mac OS 8 highlights the ability to arrange folders by name, date, size or kind. It also stores preferences on a per-folder basis: for each folder, users can set icon size, sort order and information to display. Mac OS 8 introduces persistent arrangements so that a folder automatically remains sorted alphabetically or by other characteristics. This is a tremendous organisational aid, but APC bemoaned the apparent inability to set global arrangement defaults or inherit parent folder settings.

The Internet weighs in heavily in Mac OS 8, of course. The Internet Setup Assistant is a helpful hand-holder for the sometimes treacherous task of configuring TCP/IP software, assisted by marvellous AppleGuide help and visual cues. Mac veterans will find Open Transport very comfortable to configure.

Java support is bolted on with the stable but sluggish Mac OS Runtime for Java 1.01.

Apple Applet Runner launches Java applets either from local HTML files or the Net, plus MRJ can be utilised through IE 3.0. APC tried MRJ 1.5 beta which has better performance but is less reliable in pre-release form.

Personal WebSharing is Mac OS 8's blow-away feature. A few clicks in a simple control panel and instantly your Mac is a Web server, its files available across an intranet or around the world. As with Microsoft Personal Web Server, WebSharing is as easy to configure as Apple File Sharing: simply select the folder you want to share, choose a home page and click Start. WebSharing even supports CGI, but the clincher is Personal NetFinder, which allows Mac users to share files across the Net simply by placing them within the WebSharing folder. Any browser connecting to your Mac will get an HTML-based Finder view of shared folders.

Stability is vastly improved in Mac OS 8. APC encountered no problems with existing applications including Microsoft Office, WordPerfect, FileMaker Pro, Lotus Notes, Internet applications and various utilities, some quite old. Not a single Type 11 crash was experienced in testing, suggesting Apple may have solved one of Mac OS's most glaring problems. Mac OS 8 is targeted at PowerPC-based Macs (including clones) but also supports 68040. A hefty 32M RAM is recommended (16M minimum) and virtual memory enabled by default. The OS itself uses around the same RAM as 7.6.

Overall, Mac OS 8 introduces useful advances on numerous fronts.

Dan Tebbutt

Apple Mac OS 8

■ Distributor	Apple Computer
■ Phone	1800 025 355
■ Online	http://macos.apple.com/macos8/
■ Price	N/A
■ In short	Strong, useful Mac upgrade with excellent Internet features.

Creative Infra2400 and Plextor 12/20Plex

We tested both the Creative Infra2400 16x and Plextor 12/20Plex drives on a Digital Celebris GL6200 with a Pentium Pro 200 processor powered by 64M of RAM and running Windows 95. An Adaptec 2940 Fast SCSI II controller was used to test the Plextor 12/20Plex SCSI drive. We used the Ziff-Davis WinBench 97 CD-ROM suite of tests.

As expected, the Plextor 12/20Plex proved a little faster than the Infra2400. It could access information almost 20ms faster and its transfer rate of 2,122.3K per second was too good for the Infra2400's 1,906.7K/sec.

Benchmarks

	Creative Infra2400	Plextor 12/20Plex
CD-ROM WinMark 97	1,134K/sec	1,450K/sec
Access time	124.3ms	106.3ms
Random 32K read	222K/sec	277K/sec
Sequential 32K read	1,873.3K/sec	1,983.3K/sec
Transfer rate	1,906.7K/sec	2,122.3K/sec

Plextor claims the 12/20Plex achieves a minimum of 12x and maximum of 20x performance. It has a 512K buffer as opposed to the Infra2400's 256K buffer. The Plextor 12/20Plex features a tray drive (as opposed to the caddy drives we have seen in the past) and has CD play, skip and forward, as well external volume control. A two-year warranty and free technical support is provided with purchase.

The Creative Infra2400 comes with an infra-red remote control about the size of a credit card and the thickness of a floppy disk, as well as the Creative Infra Suite utilities software. The remote lets you control volume, a

PowerPoint presentation and other PC applications. It also has buttons for controlling the pointer (albeit clumsily) and surfing the Internet. If you've always wanted a closer relationship with your CD-ROM drive, the Infra2400 will even talk to you,

although its speech is limited to such phrases as 'Loading CD' and 'Ejecting CD'.

Both drives support multiple CD formats, including Photo CD, multisession, and video. Both are good all-round performers and are priced attractively for the home market.

Roulla Yiacoumi

Creative Infra2400

Distributor	Creative Pacific
Online	http://www.cppl.com.au
Price	\$299
In short	A remote-controlled CD-ROM drive with good performance.

Plextor 12/20Plex

Distributor	SCSI Corporation
Online	http://www.scsi.com.au
Price	\$375
In short	A fast drive for a reasonable asking price.

Nokia Cellular Data Suite

This simple-to-install connectivity package works in much the same way as many others on the market — with one interesting twist. It doesn't require a separate PC Card for communication. Instead it uses the serial port to connect your mobile phone to your notebook. The \$199.95 solution is cheaper than a PC Card-based system, and it leaves the card slots available for other uses.

There are some drawbacks, however, particularly if you prefer to use your serial-port-connected mouse instead of your frustrating notebook pointing device. Also, this 32-bit application is a Windows 95-only product, and you can only use it on two Nokia phones, the 8110 and the 3810. Nokia promises that all new phones developed, such as the soon-to-be-released 8110i, will also be compatible with the software.

During installation, two modem drivers are installed onto your computer; the Nokia GSM Data-Fax and the Nokia GSM

Voice. These work just like standard modem drivers under Windows; you can send and receive email, faxes, computer files and short messages using the cellular network. Some of these processes are easier to complete than others, however. The software itself allows you to send a short message or business card or to access, edit and transfer contact information stored on the phone.

If you want to send faxes or email, or access the Internet, external software is required. Fax and terminal software such as Delrina WinFax Pro, Trio Datafax, and email applications such as MS Mail cc:Mail and TeamWARE, are supported.

The default data speed is 9,600bps. If you want to use a different transfer rate, you first need to check that it is supported by your SIM. The rate is adequate to send short messages and faxes, but access a graphics-intensive Web site and you could be waiting a while.

The small manual provided deals with installation only, which is pain-free. For

details on the actual use of the software, you need to access the online help installed with the suite. The package needs about 10M of free space for installation, which takes about five minutes at most.

A word of warning from Nokia: if you use Advance Power Management on your notebook, you may encounter communication problems or loss of connection. All in all, though, this package is easy to use, as long as you have the appropriate phone at hand and the relevant extra software installed.

Selina Mitchell

Nokia Cellular Data Suite

Distributor	Nokia
Phone	(02) 9386 3500
Online	http://www.nokia-asia.com
Price	\$199.95
In short	A relatively cheap software-based wireless data solution.

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Quake System Requirements:

IBM PC and compatibles. Pentium processor HIGHLY recommended, 486DX4/100 minimally required. VGA compatible display or better. 8MB RAM minimum, 16MB recommended (16MB required for running under Win95). CD-Rom drive required. MS-DOS 5.0 or better or Windows 95 (does not run under Windows NT). Hard drive space: 80MB.

IMPORTANT: Quake requires a floating point processor. Systems that do not have an FPU installed will not run Quake at all! **PARENTAL WARNING:** Quake contains a high level of animated violence.



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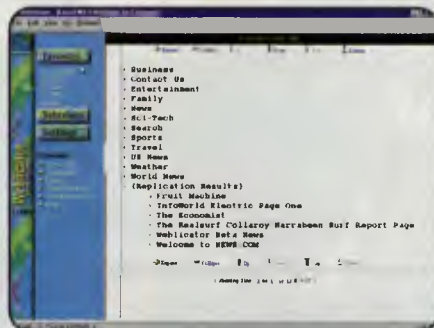
Offline browsers are nothing new. Several companies, including Travelsoft with WebEx 2.0 and InterWorld with Freeloader, have been ploughing the offline furrow with varying degrees of success for some time, but mass acceptance has proven elusive.

The main reason is that the average user can have difficulty understanding what an offline browser is used for, and reinforcing this has been the reluctance of big names to legitimise the offline browser by adding one to their product ranges.

The introduction of Weblicator by Lotus Development is likely to change that situation. It combines offline browsing, or, as Lotus likes to call it, Weblication, with notification in a neat package that will happily co-operate with most mainstream browsers.

After Weblicator has been installed, a small toolbar called the DashBoard is placed at the bottom of each Web page accessed. If the user wants that page to be regularly updated and downloaded it's a matter of clicking the appropriate button, checking some options, and then moving on to the next site.

When it comes time to browse offline, it's as easy as clicking the Weblicator icon, which fires up your Web browser of choice (as long as you're not using IE 4.0 or Com-



municator 4.0, which won't work with it until the next point release). You're then presented with a splash screen that links to a hierarchical list of sites, including quite a few that Lotus has pre-specified. Click the site name you're interested in, and up pops the Web page.

The user can specify the number of linked pages to be indexed, as well as an update schedule. When the end of the stored site is reached, a small dialog presents the option of either adding the link for future updates, or going live onto the Internet to continue.

Weblicator can also be configured to log on and download sites automatically, with the option of downloading all or selected graphics. For modem users, dial-up configuration is included.

Lotus Notes isn't required to run Weblicator, but Weblicator's interface, like that of Notes, has some clunky aspects that could be smoothed out to make it easier to get around. Unlike Notes, Weblicator's search facility is poor, with search terms on cached and indexed pages returned as not found. Another aspect which users with small local drives need to take into account is the room available for cached sites, as around five medium-size Web sites can easily blow out to more than 20M.

Those who need to have Java applets replicated are going to be disappointed, as Weblicator can only handle them if they already resident in a Notes database. There are no firm plans to add Java replication in the near future.

Josh Gliddon

Lotus Weblicator

■ Distributor	Lotus Development
■ Phone	(02) 9350 7777
■ Online	http://www.lotus.com/weblicator
■ Price	\$39
■ In short	Weblicator takes the Web on the road.

Sony DSC-F1

With its forthcoming entry into the digital camera field with the DSC-F1 Digital Still Camera, Sony is attempting to redress some of the shortcomings of consumer-line digital cameras, while throwing in a few extra features not available in ordinary cameras.

The DSC-F1 gives the user complete control over image quality. Selecting between fine, standard or snapshot quality alters the amount of JPEG compression applied to the 640 by 480 images. The camera has 4M of built-in flash memory and can store 30 images in fine mode, 58 images in standard mode, and 108 images in snapshot mode.

Exposure, shutter speed, and flash brightness are adjustable. The user can select auto-exposure or manually adjust the settings. The brightness of the image can be altered by + or - two f-stops. It also offers a good range of shutter speeds, from 1/7.5 to

1/1,000 of a second. The flash brightness can also be adjusted to + or - two f-stops. An added feature is the macro button that allows for close-range photography.

The truly outstanding features of the camera are in its various recording modes — single image, continuous, multi-screen and time machine. Selecting continuous allows either four or six images to be recorded at 0.2-second intervals, in standard and snapshot modes respectively. Multi-screen recording captures nine images on a single 'page' at 1/15 second intervals. Finally, time machine recording captures the immediate image, images after the button press, and images before the shutter button was pressed. In this mode, images are buffered in half-second intervals, and four images can be captured in standard mode and six in snapshot mode. Fine quality pictures are not available in continuous, multi-screen and time machine modes.

Options for viewing on the LCD screen include search, slide show and zoom. Search mode displays six thumbnail images, and by selecting one of them you can display the image on full screen. Slide show cycles through all the images stored in memory, and zoom allows you to enlarge a specific region of an image.

The DSC-F1 is due later this year.

Travis Simon

Sony DSC-F1

■ Distributor	Sony Australia
■ Phone	(02) 9887 6666
■ Online	http://www.sony.com
■ Price	Approx \$1,200
■ In short	Offers excellent image control and advanced image recording options.

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MYOB 7

Following the outbreak of small-business fever among the likes of Harvey Norman, Dick Smith and Myers/Grace Bros, SOHO accounting software is definitely a growth area. But the grey area between a one-person, front-bedroom operation and a fully payrolled business is one which catches many accounting packages out.

Although several packages vie for supremacy in the SOHO entry area, many find the leap to a slightly more capable and accountant-friendly set of books somewhat difficult. Most require the user to buy another package and transfer files, which may or may not work smoothly, depending on the version and the depth of information contained. This need to tread a delicate line between simplicity, comprehensiveness and upgrade-friendliness is capably addressed by the latest version of MYOB, Version 7.

MYOB 7 goes further than previous offerings by combining simplicity and icon-driven data entry at the sharp end, and new export capabilities for linking into established accountancy packages formats such as Ceedata and TELETAX.

Setup with MYOB 7 is extremely simple. The program walks you through the usual business name, tax file and ACN numbers, plus the business address; it then asks what sort of operation you are running.

Standard pre-formatted business templates offer a host of alternatives ranging from religious organisations through to bicycle dealers, funeral parlours and freelance writers. It is very comprehensive. These then apply a preset list of likely options to the accounts. So the religious organisation's books would include a section for voluntary donations, and the bicycle dealer would already have a repair and small parts section waiting to go. The advantage here is that each section is already tagged should the accountant query any entries, without any complex setting up and allocation required on the part of the user.

The initial working screen has a similar layout to previous editions, with a Command Centre offering specific options to the user. These include basic areas such as General Ledger, Cheque Book, Sales, Purchases, Inventory and CardFile. These last

two options indicate that the program is slightly broader in approach than a pure accounting package. Both link into the rest of the actions by using pop-up windows to allow new customers, parts or stock to be classified between modules on the fly. The MYOB Payroll option simply becomes a part of the Command Centre window if installed.

Data import and export is reasonably well catered for, although some users may



find the necessity to sort out and define tab-delimited, comma-delimited, ASCII or similar files a little over-complex. Some form of trial import or mapping would improve this. Import also includes the ability to port data from other PIMS should you wish to cut down on the number of programs you need running at once. Quicken files can be directly imported, and the aforementioned Ceedata, Solution 6 and TELETAX format exchange capability should endear new users to the accounting profession. The new version also includes auto-save and back-up verification to minimise the effects of hardware glitches on your precious data.

One area MYOB excels in is drilling down. Using a hollow clickable arrow format at the left-hand side of every window, each transaction or entry can be tracked back right down through balance, entry, supplier and amount windows to give a very full picture of each transaction, its history and associated balances and entries. This also applies to cheque writing, which is highly auto-

A number of new features make this a worthwhile upgrade.

mated. Either entering the name of a creditor or popping up a window of existing cheque names allows most details to be entered automatically. Then the amount is automatically cross-entered in the general ledger as well as being converted to words on the cheque itself. Much time saving there. Most fields are 'clever' in that they learn from each new entry and add them to an options window for subsequent operations. Output in the form of reports and graphs is also good. Users can opt for a range of pre-defined forms, or can generate their own with simple forms design tools.

In some areas, however, such as trying to enter back expenses, MYOB is not so helpful. It simply tells the user this account period is closed, so go away. More informative pop-up help or examples of how to edit previous account periods would definitely help — especially since the product will likely sell into the SOHO user bracket. However, to offset this, one of the more appealing new features in this version is its HTML publishing capability. This allows reports to be formatted so you can publish them directly onto your Web page or intranet. On the payroll-equipped version, you can even print your own group certificates from within the program.

Overall, MYOB 7 is solid and notably more usable than previous versions. It is easier for the new user, yet still capable of some solid reporting for professionals.

Jeremy Torr

MYOB 7

■ Distributor	Datatech Software
■ Phone	1800 555 007
■ Online	http://www.myob.com
■ Price	\$399; \$599 with Payroll
■ In short	Well worth a look for the price. Good functionality and upgrade path, yet still reasonably easy to use.

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PointCast Network 2.0

With the original 1996 version of PointCast, the craze for push technology began in earnest. A package of news and information in a screensaver format proved alluring to many users. Since that time, push has become much more mainstream. Despite the entry of Microsoft and Netscape, PointCast continues to be a major player in the field, a fact demonstrated in a recent report from Optimal Networks which estimated that 18% of HTTP network traffic was generated by the PointCast Network.

While this is the first major upgrade to the PointCast client, the product provides an interesting twist to the upgrade model. Because of its need to maintain regular (or continuous) Net connections, the PointCast client receives frequent updates and maintenance releases, a model which is also being adopted by other software packages. We examined an early beta of the product for 32-bit Windows systems (the first such native release); the finished version (including a Windows 3.1 client) should be available later this year.

While the interface for viewing content has been brightened up, essentially it



retains the same features. Channels can now be updated individually, instead of the bulk update required in earlier releases. Individual articles can also be marked as read or unread.

The main addition is a new scrolling ticker which appears at the top or bottom of the screen, and contains a customisable mix of headlines from selected PointCast channels. This is well-implemented, but hardly essential for most users. PointCast is also claiming that network bandwidth utilisation is reduced by up to 55% in this version.

One area that hasn't changed is the entirely American news base, something

the company has been promising to address for some time. A feature that may assist with this is the new PointCast Connections channel, which enables any Web developer to offer their content through PointCast using the Microsoft-created CDF format.

PointCast is hedging its bets against the threat that push clients for Web browsers create by partnering with Microsoft to offer Internet Explorer as an integrated browser. However, even if you form part of the majority Netscape-using world, PointCast is still one of the most stable and usable push systems around. Its success in attracting advertisers also means that it has a stable business model to maintain growth.

Angus Kidman

PointCast Network 2.0

■ Distributor	PointCast
■ Online	http://www.pointcast.com
■ Price	Free
■ In short	Still a strong contender in the competitive world of push technology.

PowerQuest DriveCopy

Upggrading a hard disk is not as straightforward a task as it was in the days of DOS. The GUI has complicated the matter. Hidden files and system files abound. Applications can install themselves at any location on the hard disk. Precautions have to be taken to ensure that the new disk replicates the structure of the old.

DriveCopy is a packaged solution for drive mirroring. The target market is those undergoing the upgrade cycle. Application developers are driving the need for greater hard drive capacity and drive manufacturers are obliging with more megabytes per dollar spent on upgraded storage.

Being DOS based, DriveCopy is an extremely simple program to use and can be used cross-platform on DOS, Windows FAT16 and FAT32 partitions, NTFS and HPFS partitions. Even drives with multiple partitions using different file systems (such as when an NT user keeps a separate FAT and NTFS partition) can be handled.

Using DriveCopy basically follows the same procedure across all drive types and operating environments. The source drive is set to a slave or secondary (non-booting) drive. The new target drive must be set as the master or bootable drive and must be larger in capacity than the source. After making the arrangements, simply boot onto a bootable floppy disk, swap with the DriveCopy disk (it is a single disk application), and run the batch file that installs and runs DriveCopy.

APC tested DriveCopy with an 850M IDE drive as the source and a 2.1G IDE drive as the target. We found in a number of quick runs that more than 600M of data transferred intact in just under 10 minutes. Multiple partitions also carried over onto the new drive.

APC encountered a difficulty after the transfer. Rebooting the drive required a bootable floppy and needed the SYS command to reinstall the system files. Without this fix, the freshly DriveCopied hard disk was not going to boot.

Who needs DriveCopy? Perhaps an OEM who keeps a master drive for all systems that are sold, or a service repair organisation. Certainly anyone who consistently handles duplicating hard disks can find a place for DriveCopy.

Users who don't replace their drive every month may find the time saved is not worth it, although inexperienced users wishing to avoid the hassle of manually upgrading will find this product useful.

David Lin

PowerQuest DriveCopy

■ Distributor	Multitask Consulting
■ Phone	(02) 9904 1988
■ Online	http://www.powerquest.com
■ Price	\$45
■ In short	A useful application for copying hard disks, best suited to large organisations and inexperienced users.

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QMS DeskLaser 600

Touted as "one of the smallest professional personal laser printers in the world", the low-cost, good quality DeskLaser 600 marks QMS's entry into the SOHO desktop market.

The DeskLaser's output quality is fairly good. It uses a semiconductor laser with a choice of 300 by 300dpi or 600 by 600dpi resolution. When it is set at 600 by 600dpi, small text is very clear and black areas are solid, though not especially dark. Grey-scale images are the printer's weakest point.

After a 40-second warm-up, the DeskLaser churns out pages at a rate of six per minute. Paper types supported include A4, A5, B5, folio, letter, legal and statement. It can also print on transparencies, laser-quality labels and envelopes, suiting the needs of small businesses.

The DeskLaser's compact size has been achieved thanks to its miniature OPC drum and toner. Weighing just under 6kg and with dimensions of 32 by 30.6 by

14.6cm (width by depth by height), it is slightly larger than the OKI Okipage 4w laser printer. With an operating noise level of less than 55dB, DeskLaser is one of the quieter printers on the market.

Environmental features include a positively-charged OPC drum to lessen ozone emissions and an all-in-one imaging unit that recycles waste toner. The imaging unit is the DeskLaser's one consumable and consists of dry toner and the OPC drum. It can print around 3,000 pages at 5% coverage and costs \$130, giving a reasonable cost per page of about 4.5 cents. The dry toner is a bonus, obviating the problem of ink smudges.

The plug and play Windows 3.11 and Windows 95 installation was just that. Users only have to launch the set-up program for a glitch-free installation. The DeskLaser's status monitor is a basic dialog box, but that's all that's needed with something so simple. Error messages were accompanied by helpful illustrations. One annoying flaw was the non-Windows

standard interface, which meant the dialog box couldn't disappear behind whatever application was in use.

Slightly more problematic were the paper jams. Even though the DeskLaser has a straight paper path to minimise jams, under normal usage conditions we found it jammed frequently. To avoid this, the printer requires extremely precise loading of the paper in the feed tray, which can hold up to 100 sheets at the one time.

Dominique Jackson

QMS DeskLaser 600

■ Distributor	QMS Australia
■ Phone	(02) 9901 3235
■ Online	http://www.qms.com
■ Price	\$495
■ In short	A small, low-cost, good quality printer for SOHO environments.

Lexmark Optra 1250S

Inkjets are getting faster, cheaper, more colourful and higher resolution all the time, but laser design seems to have stagnated for a while. Perhaps as a result of this, Lexmark has taken a clean sheet of paper and come up with a completely new Optra range.

Although the standard 1250S is not far from SOHO pricing at \$2,025, it offers a staggering array of add-on bins, feeders and networking extras which take it right into the departmental printer league. It also offers quality 1,200dpi printing at 12ppm, and uses Lexmark's new Prebate toner cartridge, which has the sort of rebate-on-the-bottle type arrangement used by soft drink manufacturers. The rated duty cycle of the cartridge is an impressive 17,600 pages.

Possibly because of the need to accommodate expansion trays both above and below, the Optra series looks a bit different. The casing makes it look like a microwave oven instead of a printer. Although its footprint isn't larger than

most standard lasers, it is much higher than most at 33.5cm. The front control panel is a simple LCD complemented by five buttons and a status light. The standard paper



tray takes up to 250 sheets, and the flip-out feed tray can cope with 100 sheets more. Adding a high-capacity feed tray under the printer boosts capacity to at least 2,000 sheets at one fill.

The 1250S comes with 4M RAM as standard, expandable to 68M, and is powered by a 33MHz Intel i960 RISC chip. It can also accept hard drive memory expansion if required. Power usage is slightly higher than some alternatives at 275W printing and 80W idle.

Setting up is no trickier than most printers — plug in, switch on for a test print, then load the drivers from either CD or floppy. The setup also installs MarkVision, a

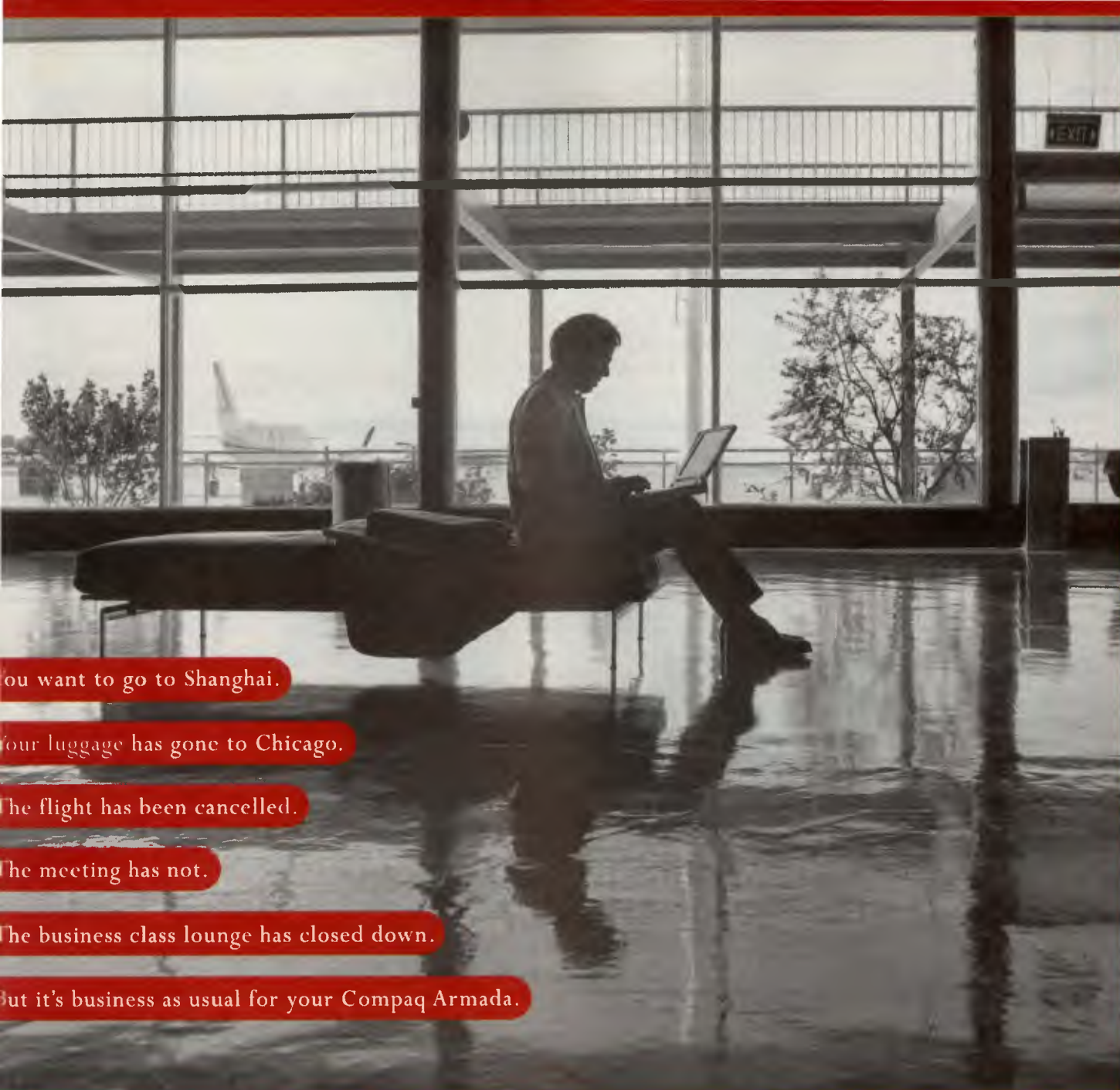
printer control utility. This adds a host of excellent network management and maintenance options to the standard print controller. These add appeal to the multiuser installation, and as a bonus are common to Windows 3.x, 95 and NT.

Printing a 1,200 by 1,200dpi full-page photo image (around 17M) took only 52 seconds for the initial print, then a mere four seconds for the second print, bearing out the manufacturer's claim of 12ppm. The quality using 1,200dpi is excellent, with very smooth tonal rendition and crisp text. For the small business user who may want to get bigger without having to trade in, the Optra is a definite step forward for lasers.

Jeremy Torr

Lexmark Optra 1250S

■ Distributor	Lexmark
■ Phone	1800 674 484
■ Online	http://www.lexmark.com
■ Price	Approx \$2,205
■ In short	High quality, economical and extremely expandable.



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Cakewalk Pro Audio 6

A number of software programs seem to have been around since the very birth of the desktop PC. One such program is Cakewalk, the music editing and publishing software. It's always been a good program, and has been regularly updated over the years, with each update offering new and exciting features.

Supplied on CD, Cakewalk Pro Audio 6.0 has a number of good video tutorials which complement its online help. A very useful adjunct is the two-CD set, Musician's Toolbox, which has a multi-

List, which displays the digital instructions in each of your tracks and offers very precise editing control, is another. Then there's the Piano Roll format, where notes

per minute. The beauty of being able to mix and match audio and MIDI tracks, however, is that the MIDI part will usually take up less than 1% of your finished production, so you don't need to worry too much about space taken up by the band.

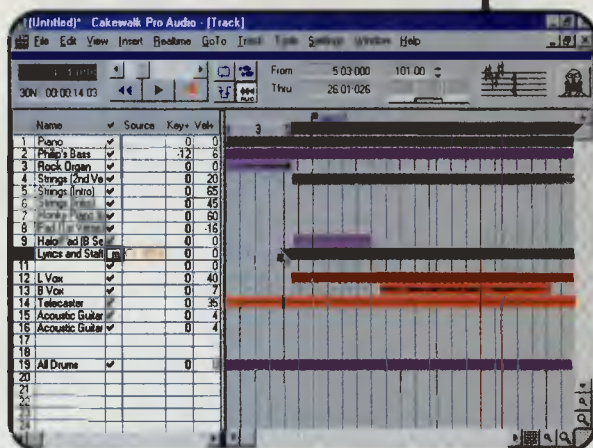
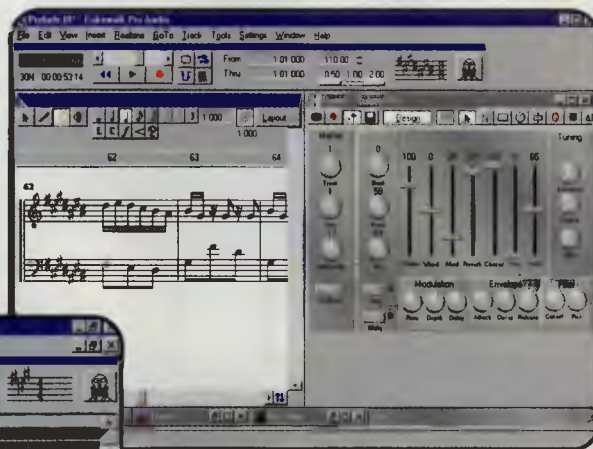
Once recorded, audio can be edited and otherwise manipulated with a set of very impressive tools, and there's truly no need for any other hardware. Reverb, chorus, EQ, flanging and much more are all accomplished using the software. The CFX audio processing, which makes these effects possible, also enables you to stretch or shrink a specific track (or

just a section of a track) to fit perfectly within a song. You can also shift, for example, a slightly off-key bit of a vocal to bring it into tune.

Of course, many musicians also want to print the various parts of their songs for others to use in a performance. Cakewalk includes the facility to notate up to 24 staves on a page in sizeable fonts. All musical expressions and markings are available for this — you can add guitar grids, use text features for titling and composer name and so on, and add lyrics.

Real percussion notation is a feature new to this version. Print your masterpiece on any Windows-supported printer and it comes out beautifully legible, good enough for the most discerning pit or studio musician to read at sight.

Eric Holroyd



tude of very usable sound and rhythm bits and pieces, plus even more tutorials.

This is a major upgrade and truly gives PC musicians complete freedom to do everything right there on the computer without the need for sound hardware other than a soundcard, which can be anything from a standard Sound Blaster 16 to Soundscape Technology's hard disk recording systems.

Integration is a word much bandied around when describing software, but is eminently applicable to the 32-bit recording studio environment. Here, MIDI and digital audio may be recorded, mixed and edited down to a fully finished track of professional quality.

Music is recorded directly into Cakewalk via a MIDI-connected instrument such as keyboard or guitar, then viewed onscreen in a variety of ways. Standard musical notation is one such view; Event

are shown graphically as blocks on a grid. A useful view for songwriters is the Lyrics view, where typed in song words automatically match to a track's notes. This option uses selectable fonts and sizes to display scrolling text during song playback.

Pro Audio refers to Cakewalk's ability to record separate audio tracks like vocals, speech and sound effects, then add or mix them with the music tracks.

Audio can be recorded from external sources such as the Line Out sockets of CD or cassette players, or you can sing or speak into a suitable microphone as well. This is useful for songs with lyrics, as the entire lead vocal track can be matched with band accompaniment, and if background vocals are required, they too can be recorded on separate tracks — a sort of 'do-it-yourself Doo Wop'.

A Windows 95 system of a 486DX-2/66 with 16M RAM is the absolute minimum for recording MIDI and digital audio, but you'd be far better off with a Pentium with more of everything, especially disk space.

The rule of thumb on hard disk recording is that an audio track uses 5M

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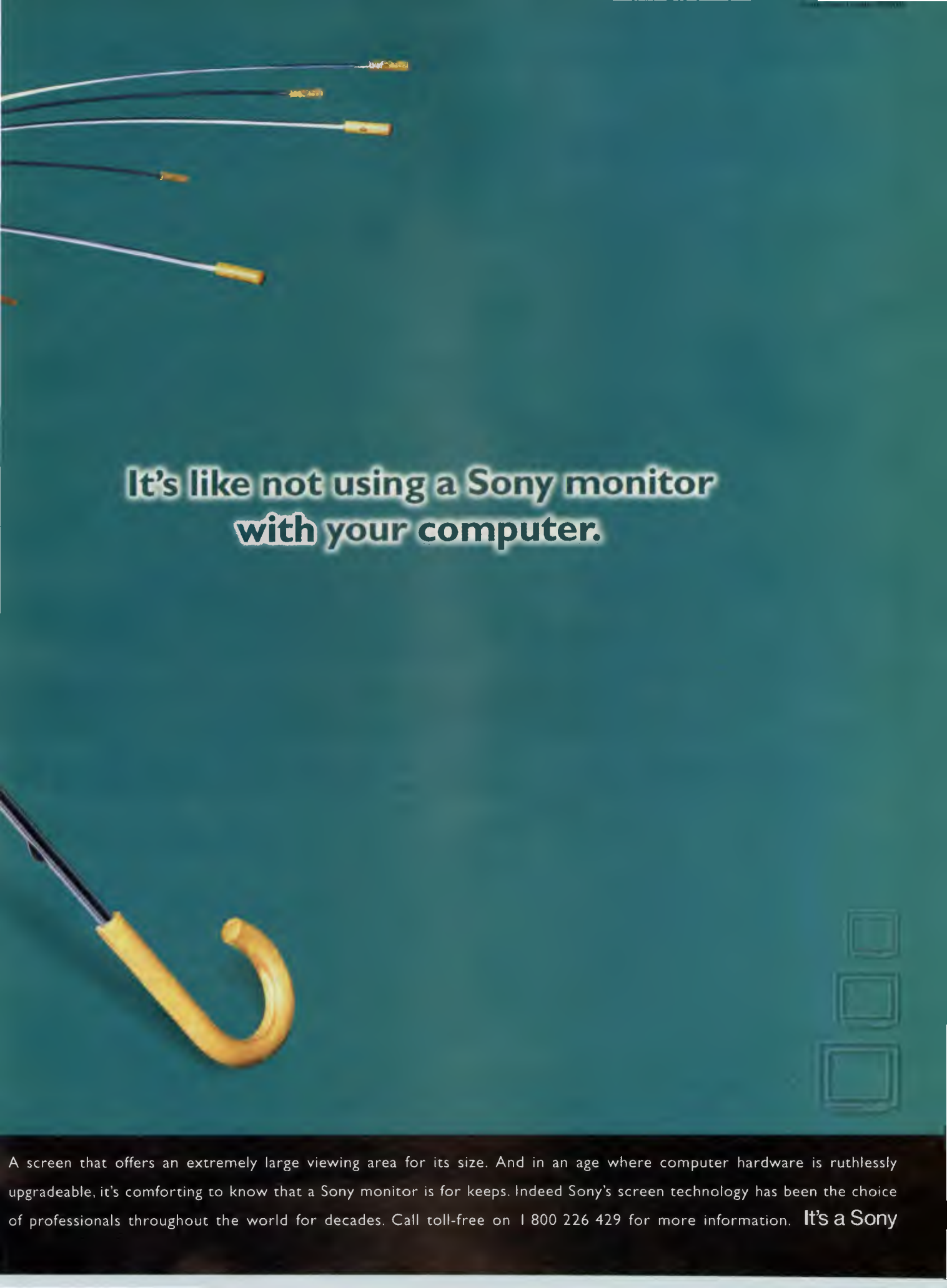
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VET

Travelling up the pointy end of the plane makes sense if you want to get somewhere in the business world. True? Not necessarily.

By Helen Dancer

On a higher plane



My favourite airline is talking about scrapping first class and making room to put more business class seats and passengers. It's irrelevant to me, because I'm not in the habit of travelling that close to the front of the plane, but I always imagined it as a hotbed of networking and high-flying (excuse the pun) business dealing. From where I'm sitting (two curtains back), I think it's probably the place where people eat and sleep better, and use their notebook computers on board just like the rest of us.

I used to think it was the place to be to overhear the scoop of the century, and the must-do for up-and-coming business people. But I've changed my mind after hearing a presentation by Apple fellow Guy Kawasaki called 'Rules for Revolutionaries'. He disparaged the notion of 'sucking up' as a way of getting on in business. His advice is to suck down to the coalface because it's there you'll find the people most willing to listen to what you have to say, and take it on board.

With typical Kawasaki aplomb, he summed it up as simply as this: the higher the altitude (in this case, on the corporate ladder), the lower the amount of oxygen, which leads to a correspondingly reduced chance of supporting intelligent life.

His premise is that the higher up a person is, the less likely they are to adopt change. Apple has, of course, enjoyed much success in the stealth-computing arena, where pockets of Mac-dom in organisations large and small outshone the rest of the Wintel-populated office and brokered a change in computing architecture. Proving by doing is part of the Mac culture, he observed, and it's a focus and a faith that has seen Apple through its dark times. Organisations that have prospered from change have, in his experience, been

driven by the coalface, not by a fancy presentation to a CIO who could see the costs of implementation more clearly than the ensuing benefits.

To illustrate, he told the story of his wife bidding at a charity auction in Palo Alto against an unknown man for a painting she quite liked. The man approached her and told her in no uncertain terms that he would end up with the painting. I'm rich, he

Gerholt, the war cry used to be 'The person who dies with the most toys wins.' But as a recent email footnote reminded me, 'The person who dies with the most toys still dies.'

What's the yardstick to measure when enough is enough? Is the measure good for all people, or is it necessarily an individual thing? When can the collecting of stuff for self give over into the stockpiling of stuff for

Is it possible to infer the nature of a company, and thus something about its products, from the nature of some of the individuals who work there?

told her, I work for Intel, I can pay any sum for that painting, and I'm going to have it. The outcome is predictable. Kawasaki's wife bid a huge sum on the painting, knowing that the other man would outbid her, and walked out knowing she had facilitated a large donation to the charity. We hope the man enjoyed his painting.

As a contrast, take the incident of a phone call between the wife of Apple co-founder Steve Wozniak and the electricity company. The caller is a Woz fan, who tells the wife it's his job to go through customers' power bills at random and help people save on their electricity accounts. I can see where you can save several thousand dollars on your power bill, he says. That's great, says Mrs Woz. When you figure it out, just let me know how much it amounts to and we can send it on to charity.

But what, if anything, does the difference between the two individual attitudes indicate about the company ethos? Who can say? It's an interesting story nevertheless. Around APC, particularly under the influence of former technical editor Ben

the greater good? Is it possible to infer the nature of a company, and thus something about its products, from the nature of some of the individuals who work there?

I know there will be plenty of people who disagree, but I have my own reasons for believing there's some truth to the notion that an organisation, being organic, is the sum of its parts, that is to say, its people. Sometimes it's something indefinably more. Over the past couple of months I have watched the assimilation into the APC team of two fine new journalists, and watched the proving of the assertion that the magazine is not just a place to work, but a culture. We're growing on them, I think, and I'm glad of it. Magazine publishing, like most facets of this industry, is like standing in front of a two-way mirror. While readers are looking in, it behoves us to be looking out and watching carefully.

In the greater industry context the question then arises: is it understanding computers that's the most important determinant of success, or understanding the people who use them? ■



Standard approach

How do you feel about standards? Do you consider how well a product follows a standard when you decide whether you are going to buy it?

By Jeremy Horey

Companies in the computer industry use the word 'standards' as a blunt weapon with which to bludgeon each other. And it's easy. The word is so debased that you can accuse the opposition of nearly anything and get away with it. Nobody really knows what a standard is any more — at least, everybody claims that their product meets the standard but the other company's stuff is way off. The most recent example of a standards word war is the furore over Java and Sun's slow progress in turning the language over to a 'standards body'. In my experience, standards bodies don't always do a good job.

A standards body is a committee made up of 'industry representatives'. What this means in practice is that everybody is pursuing their own agenda. Each member comes from a company or organisation that has its own product or at least a stake in how products turn out. To arrive at a 'standard', the committee has to reconcile all those different agendas. They do this but it is not easy and it usually takes years. What happens is that a company produces something that builds on the current standard and then refers that innovation to the committee to be included in the next standard. If the company is big enough and its product is popular enough, then the standards body has little choice but to include the innovation in the new 'standard'.

HTML is a good example. Both Microsoft and Netscape extend HTML as they see fit. They add extensions with every version of their browsers and the HTML standards committee is left behind struggling to deal with incompatible innovations from two companies that, between them, account for 95% of the Web browser market. In some cases the standards committee gets hijacked

by one side or the other. A strong and persuasive member from one organisation can sometimes gain partial control of the committee so that the standard favours their organisation. Then that organisation becomes even more aggressive in the next round of opposition bashing. 'We keep to the standard,' they trumpet. 'The other company is ignoring the users by not being compatible with the standard,' they howl. Standards committees do work hard and when they are free from outside influence they can come up with good solutions. They can also come up with impossible solutions like the Open Systems Interconnect model, but that's another story.

Standards have very little meaning because they trail the technology already in the marketplace.

But do users care about standards? Do even MIS or IT managers care about standards? In most cases the answer is no. Some organisations do mandate certain standards for their IT systems. But often there is a trade-off between how rigorous the standard is and how widely it is implemented.

POSIX is a good example. The US government mandated POSIX compliance for all its IT systems. But POSIX was so loose a standard that in the end this meant very little. People tended to think of POSIX as an inclusive Unix standard, but soon everything from IBM mainframes to Windows NT was POSIX compliant. I haven't seen anything that suggests that the adoption of POSIX as a standard in any way saved the US government any money in the IT area. What users and IT managers really want

are systems that work together. They don't want to find that their file server won't communicate with their mainframe. They don't care if both the mainframe and the file server support POSIX. They just want the two computers to work together smoothly. I don't care if my browser doesn't support the latest HTML standard, or that it might have its own unique HTML enhancements. But I will get aggravated if I can't see a Web site because it is using HTML commands that my browser doesn't understand.

Standards have very little meaning because they trail the technology already in the marketplace. Making things work in the real world has nothing to do with standards.

What counts in the real world is how the product was made. If the maker takes care to ensure that the product works smoothly with the products it's likely to get connected to, then it's easy to work with. If the company producing the product doesn't take the time to make sure that the product fits in now, there are bound to be problems.

It's hard to test even a simple product under all possible conditions. However, it's not hard to slap a sticker on the side of the product to say what it works with and what it doesn't. Nobody can complain if the product's maker has come clean. But if they don't tell the customer what's going on, they deserve all the grief the customer can give them. If computer companies spent more time testing their products and less time abusing each other we would all be happier. ■

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The problem with widgets

I visited yet another tasty press lunch last month, arranged this time by Hitachi. While there, I was struck by an issue that, despite the distractions of the food and wine, remained with me after the rest of the event had long faded from memory.

By Jeremy Torr

The issue that grabbed my attention wasn't that Hitachi was launching a range of products — although there were indeed several new products on show. It was the fact Hitachi was putting itself forward as an innovator, a design company and, most of all, a comprehensive producer of real-world products that it was going to sell across a range of markets. Not just as the maker of the world's best widget.

Now, for those of us in the industry used to selecting equipment on such tenuous criteria as 'does it have an Intel chip in it?', this was quite remarkable. Hitachi wasn't telling us it had the best DVD drive (although it did mention that in passing). It wasn't saying it had the best chipset, the quickest modem data pump or the highest spindle speed around. It was saying it was good at doing things with consumer goods. This is indeed a change, as the majority of press events today revolve around a very specific, very tangible item with given specifications and a measurable performance.

The other interesting factor to this observation is that Hitachi isn't alone in this move away from uni-product marketing. NEC also ran a roadshow recently that received considerable time and attention from the NEC marketing department. About \$1 million worth, in fact, which underlines its commitment to the idea. The NEC roadshow featured everything that NEC makes, ranging from PHS phones right through to memory chips, microwaves and portable video consoles. Oh, and it gave a nod towards computers on the way too. Add to that the fact that Fujitsu is moving posthaste into the notebook and palmtop market, and Seagate is busily promoting its software capabilities. (Did you know the company has been busily buying up software companies and

setting up a special software-management group? And that it owns and sells voice-recognition, multimedia-authoring and asset-management software? Nor did I until I asked.)

All these facts indicate a strong undercurrent of activity away from the single-expertise, single-product style of industry that has typified the hardware and software industries. Hitachi told us it was not only producing a flat-panel display that it claimed would replace the monitor as we

while, the smaller, faster industries such as wine, mining and the like went from strength to strength by not relying on a single market.

The point to this musing was that it made me ponder the strategies of the Intels and Microsofts of the world. These companies have achieved enormous success by concentrating very hard indeed on producing that perfect widget, and by putting considerable effort into protecting their markets. Everybody who wants to

The problem with relying on one line or specialisation is that it results in a noticeable degree of hardship if the rest of the world suddenly decides to stop playing your game.

know it, but it was made possible by the use of a special RISC chip, also produced by Hitachi. The chip, even more interestingly, is being churned out at a rate of around 1 million per month for use in everything from games consoles to mobile phones and from washing machines to video cameras.

If all of this has a ring of familiarity about it, think back to the halcyon days when Australia's wool, wheat and meat market was the British Empire. When all we needed to do was fill ships with the fat of the land and wait for the cheque, we needed to do little more than produce. The market did the rest. But the problem with relying on one line or specialisation is that it results in a noticeable degree of hardship if the rest of the world suddenly decides to stop playing your game. Which, given the lack of predictability of any global market, will undoubtedly happen. And it did happen to us. Mean-

use a computer has to use an Intel product or a Microsoft product . . . at the moment.

But if somebody else halfway across the world invents a whole new system that doesn't need the widget, the sole producer will be in a bit of poo and no mistake. Especially if the company that has invented the new system can produce almost everything it needs to build it. Then the expert specialist is left holding a very particular and rather pointless baby. This could give a clue as to why these major companies are all migrating away from their original, established strengths.

If you are thinking of buying one of the new Windows CE handheld PCs, look on the box for that oh-so-familiar 'Intel Inside' sticker. There won't be one. It will have a 32-bit RISC chip in it, built by those diversifiers who intend to avoid getting stuck with one widget. This could be the thin end of the wedge, Intel . . . ■

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Hitting the target

A Pentium in the home but a 486 on the battlefield . . . This is the future of technology in the military.

By Bruce McCabe

The other day someone drew my attention to an article they had spotted in an aviation magazine. The topic was defence and the RAAF's recent selection of a new missile for the F-111 aircraft, called the Raptor. What was so interesting about this was its brain. The guidance system was built around . . . wait for it . . . an Intel 486. The very same little item that you use to type letters to dear old Auntie Mabel, calculate mortgage payments and entertain the kids after school is a lean, mean killing machine. Apparently the 486, suitably equipped with 32M of RAM, is an ideal choice for this particular application (blowing up ground targets). And it's not the only PC chip that fits the bill: the article suggested that Motorola 680x0 microprocessors are used at least as frequently in other missile designs.

The first thing I thought of when I read this was that the 486 seemed a bit old. This response came partly from the knowledge that the 486 is considered obsolete in the commercial PC market. But I was also thinking about performance — wouldn't missile designers routinely put the fastest chips (for more accuracy) into their product? After all, a component saving of a couple of hundred dollars would hardly be an issue when the finished product sells for hundreds of thousands. But I suppose this is one application where you want something tried and tested making calculations such as when and where to explode. One can imagine some anxiety might have resulted from receiving a shipment of Pentium-equipped Raptors after the floating-point 'bug' was discovered.

I suppose we shouldn't be surprised at such an application for the humble PC processor. After all, a very large percentage

of the games we play on our machines at home boil down to much the same thing: tank warfare, naval battles and, most commonly, fighter simulations. Technology and the military have always gone hand in hand as nations strive to maintain an edge over one another, and the pace of technological development is always boosted significantly during times of war. Over the past 50 years the military has embraced high technology as quickly as it can be developed, with modern armies becoming dependent on computers in all aspects of their operations — communications, navigation, logistics, intelligence, training, and on the battlefield.

Perhaps the most bizarre application I have seen in recent times has been Doom 2 being used to train US marines in infantry combat. Apparently they got some programmers in at Quantico to modify the game to include trenches, barbed-wire and uniformed enemies. I wonder if they get more than one 'life' in their version?

The promise for the future is higher levels of automation on the battlefield, including widespread use of remotely-piloted aircraft and more automation in ships and vehicles to reduce the human exposure at the sharp end, thus reducing casualties. Of course, this only works for the 'haves'. Generally speaking, the 'have-nots' are in for destruction and devastation of unimaginable intensity. The 1991 Gulf conflict illustrated that dramatically enough. Who will forget the 'video game' footage that was beamed into our living rooms in each evening's news broadcast? Of course, this also illustrated one of the most disturbing aspects of military high technology: the distancing of mechanical actions from the very human consequences.

Another disturbing consequence of the

military/high technology relationship is the control the US government tries to maintain over issues such as encryption. Anxious to maintain its own effectiveness, it has been a major force in limiting commercial and consumer access to encryption technology, except where it has the technical capability to crack the code or is provided with a software 'key' in advance. You can have privacy from anyone you want . . . except Uncle Sam.

High technology in itself has become both weapon and target in the military world. The US armed forces openly discuss their strategies to use IT (they even have Web sites on the subject) to destroy or, better yet, subtly change the information owned by would-be antagonists, altering intelligence or instructions to induce tactical and strategic errors from the opposition. Collectively, this type of aggression is included in the modern military lexicon under 'information warfare'. This is quickly leading to the remarkable situation where viruses have become a front-line weapon.

You have to wonder just how vulnerable all this technology makes the users. I'd hate to be facing down an enemy tank and have my fire-control system decide to GPF. Early this year the army staged a display of the Australian infantry of the future. Each decked out with night-vision goggles, microphone, earpiece and satellite communications gear, soldiers could talk to each other over the radio and were individually linked back to headquarters so that their positions could be plotted on a map to the nearest inch. But if the opposition managed to hack into *that* signal . . .

Bruce McCabe is a market analyst with Gartner Group.



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Money don't get everything it's true. But what it don't get I can't use. So gimme money, that's what I want . . .

By John Sterlicchi

Gone are the days when a group of Silicon Valley folk met up, sipped on their bottled water and talked solely about technology. Sure, Intel bringing out a faster MMX chip is interesting, but is it as intriguing as the company's chairperson Andy Grove pulling in the best part of \$US98 million last year? Or the fact that three Cisco executives were in the top 10 earners across Silicon Valley in 1996 with packages ranging from \$US12 million to \$US33 million? Most people I meet on my travels around the Valley prefer to talk dollars rather than DVD. As sport is in a little summer hiatus at the moment, money is the number-one topic of conversation, and Americans, being open and honest, have no qualms about telling you exactly what they earn and what they are worth.

I moved here from Sydney nearly 10 years ago and people have always chatted wistfully about the fortunes Bill Hewlett and David Packard made, and even paid tribute to Bill Gates. But until recently the multimillionaires were not too thick on the ground. Nowadays we're tripping over them. Those not in the money can blame the likes of Netscape and the flood of other new companies in the Valley for the astronomical price of homes and the jam-packed freeways as more and more people flock to this part of the aptly-named Golden State. Those in the money simply thank Netscape and the effect the Internet has had on the US stock markets.

For some reason, investors believe that if your company has anything to do with the Internet it also has a licence to print money. How else can you explain the founder of online bookseller Amazon.com taking his company public and becoming

a multimillionaire? His company's prospectus admitted that Amazon.com was losing money hand over fist and he wasn't sure when or if it would ever be profitable.

Along with the Amazon founder, several others made their fortunes that day because Silicon Valley companies have fallen in love with the idea of giving more and more of their employees stock options. Stock options allow employees to buy shares in their employer at an advantageous rate. Employees can then sell the shares at the market price and make a killing. It locks employees in and is a great incentive for people to work hard to make profits to push up the share price. As you might be aware, the US stock market has been roaring ahead for the best part of five years — technology stocks are often among the winners — and that is why executives and some lower-level employees in Silicon Valley are dripping cash. A recent survey of the Valley's top 150 companies showed that the top 771 executives collected more than \$US1 billion in total compensation last year. That's a 34% increase from 1995 and double the 1994 total. Interestingly, few people begrudge Andy Grove his rewards. He's obviously devoted his life to Intel and built the company into a powerhouse. In fact there are 'compensation experts' who believe Grove might even be underpaid because of the value he has brought to the Intel shareholders.

But not everyone who makes a packet in the Valley deserves it. Shareholder-rights groups scrutinise balance sheets and criticise executives who pay themselves huge bonuses as their companies teeter on the edge of the gurgler. Jerry Sanders, chairperson of AMD, the perennial chip-making also-ran, is frequently

the subject of shareholder scrutiny. His pay packages have long been huge despite the fact the company has under-performed most years. At present he has a deal whereby the company even lends him millions of dollars so he can buy his stock options. AMD became famous for 'repricing' Sanders' options. As the company's share price went down, so did the price Sanders had to pay for his option, making sure he was well compensated as the company performed poorly.

Repricing is now a favorite pastime among companies whose stock price has floundered. More than 20 Silicon Valley companies, including Netscape and LSI Logic, repriced their options last year to ensure their executives did not miss the gravy train. Interestingly, Jim Barksdale, Netscape's CEO, recently announced that he had a 1997 salary of \$US1. He wanted to show shareholders he wanted to be rewarded for success. Don't worry, Barksdale won't go hungry. After selling off nearly 2 million shares of Netscape stock for a total of approximately \$100 million in 1996, Barksdale still controls 6% of the company's stock, about 5.3 million shares, worth approximately \$124.5 million.

Being shown the door or, as they say here, 'let go' is not a bad way to make a buck either. Apple's Michael Spindler walked away with slightly more than \$US4 million in total, and the ex-bosses at Tandem and Amdahl did even better. It's the dream of everyone here to join the right company just before its shares take off. As the man on the exercise bike said to me the other evening, "I'm changing jobs because the stock options at the new one are \$US2 and they are \$US5 where I am." Who cares about the pay cheque?■

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Seeing is believing?

Many people who wouldn't accord credibility to a trashy pamphlet on the street will read the same content from the same person on the Internet and treat it as gospel.

By Philip Argy

When you're doing some research and need to be comfortable about the source material you are using, how do you satisfy yourself? Do you take the same steps when surfing the Net for information? If not, why not? And what are the consequences of uncritical reliance on unreliable, unverified source material?

There are many facets to the issue, including access mechanisms (local or intermediate caching can make the information you are using obsolete if you forget to refresh), lack of sovereignty (no government has jurisdiction over the Internet, so it's hard to enforce any content standards), lack of peer review (it's difficult to establish the peer acceptability of Internet content, although links from a known reliable page are very helpful in this regard), content attribution (the advent of frames sometimes results in content appearing to be sourced from an author other than the true author), and myriad other issues that space constraints don't permit me to address.

What can you do to verify the reliability of your content? As you do with a book, you check the author, the publisher, the date of publication (is the information current?), the credentials of the author and any reviewers. One useful approach is to use a search engine such as AltaVista to look for credible references to the content you wish to check. In AltaVista this can be done by using the 'link:<searchstring>' simple query to find all pages with links to a page containing <searchstring> in its URL. Many of the major search sites also classify and categorise things for you. This can be very useful if you aren't sure of the scope of particular material (but be careful about relying uncritically on someone else's classification or categorisation). With the increase in use of site classification using

PICS (Platform for Internet Content Selection) and RSAC (Recreational Software Advisory Council) it will soon be possible to get the view of a particular site from an organisation that you trust. Although the PICS/RSAC schema is presently rather narrow in terms of the attributes that it represents, potential extensions to the paradigm will permit all kinds of attributes to be rated, including academic rigour, peer acceptance, and so on. That will make the life of the researcher much happier.

If you are placing material on the Web, what liability do you have if it's wrong, and someone relies on it to their detri-

ment? The answer really depends on what you say about your material. Provided that any qualifications are also on your site and easily located (such as a disclaimer), and provided that nothing on the face of your material suggests that it is more reliable than it is, you are unlikely to be liable if someone relies on it. Similarly, if you rely on information that someone else has put on the Web, you can't complain if you never bothered to verify its authenticity.

If you are placing material on the Web, what liability do you have if it's wrong, and someone relies on it to their detriment?

There are some other interesting issues associated with the use of Internet content. I have previously dealt with the censorship/content regulation issue (see APC August 1996, page 64). But given that the majority of you reading this access the Internet using your employer's resources, what can your employer do? Most reasonably-sized organisations can justify installation of a firewall and the use of a proxy server. With these tools they have the

prospect of protecting the organisation against all but the most determined hackers, and also the prospect of limiting access to sites that are not regarded as sources of reliable information. This can be done most effectively by having experienced searchers (such as the company librarian) compile lists of pre-vetted and reliable sources of information relevant to the organisation. On our firm's intranet we have links to Internet sites that we regard as useful and reliable for our staff to use in the firm's business. These include daily court lists, the AustLII legal information database, Foundation Law, federal government depart-

ment pages, professional association sites both local and international, and the like. The role of the librarian (whether private, corporate or public) is likely to be enhanced with the Internet assuming an increasing share of the research burden around the world. Someone skilled in the search for information of the kind found in most reference libraries can help you greatly to both hone in on information most likely to be of value and also to give you an idea of the reliability of the retrieved information. So to those librarians who feel threatened by the Internet, just get in there and start surfing so you'll be able to demonstrate what a wonderful contribution that you can make to a world that will suffer from information overload and an excess of useless, time-wasting information. Just remember, when you are looking for seriously useful material on the Internet, seeing is not always believing.■

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Millennium bug

In May *APC* (page 107) Helen Dancer and Philip Argy addressed the so-called Millennium bug and its effects. I should have written then, but didn't, and now in June *APC* (page 67), Ms Dancer addresses it again.

I am very surprised that there was virtually no mention of the possible effects of this problem on PC owners/users. I would have thought that as you specifically aim at the PC arena and claim expertise in it, that you would have addressed (and I hope you will address) the issue in depth from a PC viewpoint.

As I understand it, there are three basic problem areas: the BIOS, the operating system(s), and application software. Then there are the grey areas of interaction problems between each of the basic areas. Being in general terms just a user of PCs as tools, I probably have some chance of investigating and assessing how the application software I use is going to weather the change to the year 2000, but in all the other areas I have no hope. I expect you to provide the guidance as to what to do, look for, and so on.

For example, my current understanding is that all 486es and earlier have BIOSes that are *not* year 2000 safe. If that is so, then it is likely that the same applies to many Pentium-based PCs as well. Apart from identifying the problems for us, I hope that all future hardware and software reviews by you will carry a (compulsory) addition to their summaries, 'This product is year 2000 safe' or not, as the case may be.

Allow me to challenge one point made by Helen Dancer. I do not believe that the extra processing required to process four-digit years over two-digit years was ever a consideration when I was writing programs in the early 1970s. What was of very considerable concern was storage space and its cost. For example, we had a minicomputer with two removable 2.5M

drives, one of which had the operating system, and maybe the data-processing programs we were using. The other could then be wholly devoted to data.

Assume you have a customer base of 500, which means you have up to 5K of data storage for each customer's details. Not much space if you want to store, say, 10 transactions per month for a year. Ten dates per month would require 960 bytes for eight-digit dates, or 720 bytes for six-digit dates, which are up to 19% of the data storage available, an incredible proportion.

One efficient solution for us at the time was to use two-byte integers (a 75% saving over 8 bytes) to store dates in — the five least significant bits store the day number, the next four the month, and the remaining seven were available for the year. Ignoring the highest order bit to avoid negative-integer problems left six bits, or a 63-year range. For unremembered reasons we used a base of 1960, which gave us a 50-year range from the early 1970s.

Though the mini-computer concerned has long been scrapped, I was amazed to discover that several of the programs using those single-integer dates are still running. And I'm not going to apologise for writing them that way.

Peter Haughton
Internet

Ed: APC will continue to report on the millennium bug as developments occur. This month there is a Workshop article on page 164.

Year 2000: The good, the bad and the misinformed

Perhaps the easiest and most entertaining way to expose Y2K for the hype it is, is with a quote from Bill Gates.

Gates said, in answering a question on the year-2000 problem, 'I'm surprised at the figure that people throw around in terms of how much it's going to cost to fix this.'

As the figurehead of an industry, his words far outweigh the hard-cover,

We welcome comments and suggestions. Send correspondence to *APC Readers Say*, PO Box 37, Sydney 1028; or by email to: APC@acp.com.au.

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leather-bound briefing documents coming out of the Gartner Group. Gates, calling on his days as a programmer, has been quoted on the fixes for all the major year-2000 problems including Cobol, client/server and PCs, as have many others (do an Internet search on Y2K).

If the number one computer guy in the world doesn't rate it as a biggy, it kind of makes all the people in Armani suits doing headless chicken impersonations a tad out of touch.

If Gates is the good guy, and the Gartner Group the bad guy, then the terminally misinformed are the CEOs and CIOs of the world's companies. Many CEOs and CIOs are clueless, technically, which is fine most of the time. Their job is to manage people and negotiate vendor contracts, though sometimes they even get that muddled — witness outsourcing.

But the CEO and CIO get into trouble when the issue is so fundamentally technical that, unless you know how to program, you can't even begin to tell how you would fix the problem.

Everyone knows that the problem is two digits versus four. Watch the CEO puff out his chest as he explains 00, and then 1900 versus 2000. But the CEO and CIO are ultimately at the mercy of their vendors, who tell them that it's a huge and complex job. 'Oh, and by the way,' says the vendor. 'You have 10,000,000 lines of code, and if you put a dollar sign in front of that number, that's how much I'm going to be billing you.'

Y2K is not that hard. Sure, it's a headache. Development staff will do overtime. Managers will have to write a few documents. Auditors will have to check that it was done. But it is really no worse than having a couple of teeth pulled; not pleasant at the time, but a week later you'll wonder what all the fuss was about.

As for the business managing the process, yes, they will have to do some work. I work for a multinational with over 90,000 employees in nearly 100 countries. We have thousands of systems, but then again, we have thousands of people looking after them. It's called business. This is the scale that we operate at every day. It's an item on the to-do list, not the end of the world.

Angus Clacher
Internet



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At the beginning of the decade, printers became the standard home peripheral, followed by modems a few years later. Now it seems scanners are having their day.

Flatbed scanners

Homes and small offices are finding countless uses for scanners, which have become affordable companions. Although local research firms were unable to supply market-share figures, we took the noticeable increase in advertisements for scanners over the past 18 months to mean that this is a fast-growing segment of the peripheral business. So this month we have concentrated on entry-level flatbed scanners.

But first, an acknowledgement. It's not often that Price Watch receives exceptional service over the phone, so we feel compelled to acknowledge the helpful, friendly advice provided by the representative from Melbourne-based Australian Corporate Technology. Our caller experienced sheer delight as the representative patiently explained the capabilities of the HP ScanJet 5p colour scanner, outlined all the bundling options, and listened to our questions and answered them with what seemed to be genuine interest in our purchase. He stood out as the most professional and courteous representative we have spoken to all year. Price Watch requested details on flatbed scanners suitable for a small office, where the main requirements were scanning text documents and occasional logos,



pictures and graphics for tenders and proposals.

The Hewlett-Packard ScanJet 5p was the most popular scanner recommended; others included Plustek Pro 4800, Microtek E3, Umax Astra S600 and the AVEC IIS3. All representatives politely answered our

questions, although the level of detail and time they were prepared to spend varied. For example, the representative from Proscan asked one question ("What's your budget?") and said she would fax the relevant information. We weren't given the opportunity to ask additional questions.

Flatbed scanners

Distributor	Telephone	Scanner	Price	Bundled software	Resolution (dpi)	Hardware interface	Colour mode
Adelong Computers	1800 626 345	HP ScanJet 5p	\$535	PaperPort, Photoshop Lite	300 by 600	SCSI	24-bit
AMT Electronics	(03) 9890 3381	Plustek Pro 4800/ HP ScanJet 5p	\$355/\$515	Not known/ Corel PhotoPaint	300 by 600/300 by 600	Parallel/SCSI	24-bit/24-bit
Australian Corporate Technology	(03) 9428 8895	HP ScanJet 5p	\$536	PictureScan, PaperPort, Corel PhotoPaint, HP Copy Utility, OmniPage LE	300 by 600	SCSI	24-bit
Biscom Computers	(02) 9477 2380	Microtek E3/ S600 HP ScanJet 5p/Umax	\$499/\$779/ \$579	OmniPage Lite/PaperPort/ PageMaker	300 by 600/300 by 600/ 300 by 600	SCSI/SCSI/ SCSI	30-bit/24-bit/ 30-bit
Invisage Technology	(07) 3217 3004	HP ScanJet 5p	\$570	OmniPage, PaperPort, Corel PhotoPaint	300 by 600	SCSI	24-bit
Pongrass Australia	(02) 9369 3111	Umax Astra 600S	\$530	PageManager VistaScan Umax Copy Utilit	300 by 600	SCSI II	30-bit
Proscan	1800 654 930	Microtek E3	\$499	OmniPage LE, PhotoImpact SE	300 by 600	SCSI	30-bit
Ryan Computer	(02) 9553 8355	HP ScanJet 5p	\$595	Not known	300 by 600	SCSI	24-bit
Software Warehouse	1300 369 799	HP ScanJet 5p	\$879	OmniPage Pro (valued at \$1,099)	300 by 600	SCSI	24-bit
Teco	(09) 479 4355	Avec II S3	\$407	Not known	300 by 600	SCSI	24-bit

That said, we received specifications by fax within five minutes of completing the phone call.

All representatives were asked to fax through pricing and technical specifications, although only four out of the 10 obliged. Those who failed to forward information included Adelong Computers, AMT Electronics, Biscom Computers, Invisage Technology, Ryan Computer and Software Warehouse. The representative from Biscom Computers advised us that he did not have any brochures in his store, and suggested we call the main store. However, despite its promise to fax details straight away, nothing was forwarded by that store either.

With the exception of the Plustek Pro 4800, all the scanners that were recommended had a SCSI interface. While this will be the preference of many users, SOHO users would probably want to consider a parallel interface, particularly if they have two or three PCs sharing the one device. The advantage of a parallel interface is flexibility, while a SCSI interface will operate slightly faster.

Software bundled with the scanners varied. At a minimum, all offered optical character recognition (OCR) software for converting printed pages into word processing documents for manipulation, while some also offered photo manipulation software. Pongrass, Software House and Australian Corporate Technology offered upgrade deals to full versions of OmniPage Pro Version 7.0.

A word of advice: consider the software you will require before you select the hardware. You may find yourself spending \$500 on your scanner and an additional \$1,500 on software. Do you need sophisticated text manipulation? Photo manipulation? Multifunction document processing (faxing and copying)? What about handwriting recognition? Many dealers offer flexible bundling deals, so remember to enquire about the software options when investigating the hardware. Pricing for flatbed colour scanners suitable for a small office ranged from \$289 for the Plustek OpticPro 4800 through to \$779, the highest price quoted, for Hewlett-Packard's ScanJet 5p. Most hovered between \$500 and \$600.

Two companies provided pricing on the Plustek OpticPro: Software Warehouse (\$289) and AMT Electronics (\$355). It is interesting to note that Software Warehouse was advertising the same scanner a few months ago for \$429.

Seven of the 10 dealers contacted recommended the ScanJet 5p. The lowest price, \$515, was quoted by AMT Electronics, while the highest, \$779, was quoted by Biscom Computers. All other pricing ranged between \$535 and \$595. Two companies offered an upgrade to OmniPage Pro 7.0 (rather than the Lite bundled version): Australian Corporate Technology (\$786) and Software Warehouse (\$879). The Microtek E3 was priced at \$499 by both Biscom Computers and Proscan, although the software bundle

differed (see the accompanying table). The Umax S600 Astra was available from Pongrass Australia for \$530 and Biscom Computers for \$579. The only other scanner recommended was the Avec II S3 from Teco for \$407. Pricing in the scanner market appears relatively stable. Still, it is worth checking advertisements in the computer guide liftout in your newspaper and the PC SuperMarket and Marketplace sections in APC for comparative pricing. You're sure to be able to negotiate the \$40 or \$50 difference with your local dealer.

Our charter and method

Price Watch is an exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and records are kept of conversations. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct, we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.



Making your complaint official

If you have a problem with a vendor you have not been able to resolve, it is best to contact the relevant fair trading or consumer affairs department. Their role is to mediate between the consumer and trader, and to resolve consumer issues.

Remember, these departments are state, not federally, controlled. All complaints must be lodged in the Australian state where the vendor — not customer — is located. This means that if you live in Tasmania but purchased goods through a vendor in Sydney, a complaint must be lodged with the NSW Department of Fair Trading.

Here are contact details for the state fair trading and consumer affairs departments across Australia:

AUSTRALIAN CAPITAL TERRITORY

Department of Fair Trading
110 Monaro St
Queanbeyan NSW 2620
Phone: (06) 299 3433

NEW SOUTH WALES

Department of Fair Trading
1 Fitzwilliam St
Parramatta NSW 2150
Phone: (02) 9895 0111

NORTHERN TERRITORY

Office of Consumer Affairs and Fair Trading
43 Mitchell St
Darwin NT 0800
Phone: (08) 8999 5184

QUEENSLAND

Office of Consumer Affairs
50 Ann St
Brisbane Qld 4000
Phone: (07) 3246 1500

SOUTH AUSTRALIA

Office of Consumer and Business Affairs
91 Grenfell St
Adelaide SA 5000
Phone: (08) 8204 9777

TASMANIA

Office of Consumer Affairs
99 Bathurst St
Hobart Tas 7000
Phone: (03) 6233 4567

VICTORIA

Office of Fair Trading and Business Affairs
252 Flinders St
Melbourne Vic 3000
Phone: (03) 9267 6000

WESTERN AUSTRALIA

Ministry of Fair Trading
251 Hay St
East Perth WA 6004
Phone: (08) 9222 0666

Has the service you've received from a vendor over the phone ever been bad enough to put you off actually buying from them? By Roulla Yiaccoumi

The quiet complainer

Advertisements are wonderful things. Open any computer magazine and hundreds of ads jump out at you, vying for your attention and your business.

'Software and hardware at the best prices', 'Unbeatable value', 'We will not be beaten on price or quality' are the familiar catchcries of PC ads — but what about service? Does getting good service actually matter to the average punter, or is the best price in town the overriding factor?

From the numerous letters we have already received at APC, it seems service is a crucial consideration for buyers.

When you dial the phone number listed at the bottom of an advertisement, you expect the person at the end of the line to be helpful, friendly and knowledgeable.

However, feedback from our readers has led us to believe that contacting a vendor can sometimes be pot luck. If the person at the end of the line rubs you the wrong way, do you persevere or do you hang up and move on to the next vendor? And if you do simply try someone else, would you bother lodging a complaint with the original vendor?

In most cases, the answer is No. The disgruntled potential customer instantly assumes the role of the 'quiet complainer' — someone who may not have actually purchased a product, but has sworn off ever going back to that vendor because of inexcusably bad service.

If this has happened to you, our advice is to contact the company and let them know how unimpressed you were, and that you have taken your business elsewhere. If the salesperson fails to take your complaint seriously, we suggest you ask to speak to the person whose chief concern should be resolving issues with unhappy customers — the managing director.

Then contact us. We want to hear your stories about who has gone out of their way to help you, and who has lost your custom for good.

A case in point

APC received this letter from a customer who cancelled an order because of poor customer service.

Dear APC,
In response to an Encyclopaedia Britannica CD advertisement that appeared in a magazine, I rang the toll-free number and ordered a copy. I was told that I would have it in 10 days. Not having received it after two weeks, I rang Britannica's office and was assured that a salesperson would dispatch it to me at once, and would also promptly call back to confirm this. Not having received either the goods or a phone call two days later, I rang again and was told exactly the same thing as before.

Three days later [which was three weeks after ordering the CD], having heard nothing from the Britannica Centre, I called again and demanded to know just what the hold-up was. I was given a Brisbane phone number to call because I was told the Brisbane office handles the Northern Territory's sales orders.

The person in Brisbane promised to sort things out immediately and ring me back in 10 minutes. After waiting for more than two hours, I called again and was told that the person didn't call me back because the person who had the sales orders information (who was in Sydney!) was not answering the phone. Why did the Sydney office give me the Brisbane office to call when Brisbane had to ring Sydney for the information I was requesting?

I rang the Sydney office again and asked to speak to the manager. I was told that he was still at lunch but to "leave your phone number and he will ring you as soon as he returns". To say that I felt like I was running around in circles is putting it very mildly. Convinced that I was dealing with an exceptional team of incompetents, I cancelled my order.

There are software stores in Melbourne and Sydney who can deliver an order to my doorstep in Darwin in 24 hours, and others who take two or three days. Britannica Centre was unable to even get things moving in three weeks. It wasn't the waiting that prompted me to cancel my order. It was the zero response to my queries and the feeling that I was continually being given the runaround.

Brian Tomlin
Casuarina, NT

APC forwarded the above letter to Encyclopaedia Britannica and received the following response:

Dear APC,

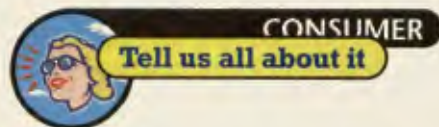
Thank you for the opportunity to respond to the concerns raised by your reader.

Firstly, on behalf of the team at Encyclopaedia Britannica, I would like to apologise for the difficulties experienced by your reader in obtaining a copy of the Britannica CD 97. We endeavour to make sure this type of scenario is rare within our company, as we are strongly committed to handling customer orders efficiently. In fact, we are constantly improving our procedures and processes to deliver the best customer service we can.

After all, responding to the information needs of the community is what Encyclopaedia Britannica has been based on for over 226 years.

I do realise, however, that in this case we have failed to address those needs adequately, so if your reader would like to contact me to further discuss the circumstances of their situation, I will personally ensure the matter is resolved to their complete satisfaction.

Peter Higgins
General manager, Marketing
Encyclopaedia Britannica Australia



Service & Reliability is APC's consumer column. We invite you to send details of your buying experiences to:

email complaints@acp.com.au
fax Service & Reliability at
(02) 9264 6320
mail Service & Reliability
Australian Personal Computer
PO Box 5252
Sydney NSW 1028.

Please keep your letters to no more than 300 words. All letters must contain a full name, address and contact phone number.

APC reserves the right to edit any submitted material for length and clarity.

We can publish only a selection of letters each month and regret that letters cannot be answered personally.

Novell looks to a future driven by business-to-business transactions across the Internet.

Down on the border

In his *Bachelor Home Companion*, satirist PJ O'Rourke laments the fact that he lives in an age when the phrase 'alcohol free' is used more often than 'free alcohol'. Similarly, corporations that have rejoiced at the idea of using the Internet as free infrastructure are lamenting the fact that the Internet is infrastructure-free. Networking giant Novell hopes it can build a new business on that premise.

The Internet is, of course, famous for its lack of security, absence of quality-of-service guarantees, and utter lack of regulation, and in many ways this has attracted business to the Net. A network accessible by all at little expense is seen as having the potential to reduce costs dramatically, by making it easier for customers to buy directly, and by removing the need for the complex sales and inventory infrastructure most corporations maintain.

'Customers' does not necessarily mean 'consumers', however. The real prize is business-to-business transactions. Accountants the world over are salivating at the thought of all the paperwork generated by invoices disappearing, to be replaced by digital transactions entered directly into accounting and inventory systems. Customers can also mean internal customers, and using the Internet to create networks-on-demand within an organisation is another scenario which has bean counters rubbing their hands with glee, as a permanent connection to the Net can be far cheaper than leased lines.

Business-to-business transactions over the Internet are also expected to be the real driving force behind electronic commerce. Analyst firm Gartner Group predicts as much as \$US200 billion per year will be transacted between businesses over the Internet within 10 years, far ahead of even the most optimistic estimates for Internet retail sales. Networking vendor Cisco Systems already does \$US1 billion a year of sales over the Internet, while Dell sells \$US1 million worth of personal computers every day over the Net.

But Dell and Cisco have far greater resources than small-to-medium businesses, which have long recognised the potential of electronic transactions but have been put off by the cost.

Smaller businesses also remain justifi-

ably terrified by the Internet, which is the polar opposite of the internal networks they're accustomed to. Network operating systems such as Novell's NetWare have made it possible to ensure users have access only to the files and resources they need to carry out the business of their company. Businesses are also confident that they can



keep resources such as databases secure internally, and replicate these security setups in multiple locations. But they are — quite rightly — apprehensive at the prospect of their carefully designed and built network infrastructure meeting the infrastructure-free Internet. The idea of someone placing an order directly into their databases sounds great, but it is not a justifiable risk given the amount of work that's usually been done to keep the database safe and locked away.

Enter Novell, with its BorderManager product, an integrated suite of tools to manage the interface between secure networks and the insecure Internet. BorderManager provides a firewall for security, the ability to create virtual private networks by replicating policies through Novell Directory Services, and a proxy server to act as a staging post between devices on the LAN and the Internet. The software also makes it easy to manage end users' Internet use by blocking access to certain sites. It is seen by Novell as the first new product in what it calls the Network Services market.

BorderManager is perhaps most important not as a product, however, but for the direction it signals for Novell, which late last year was more than happy to concede

NT's superiority as an application server. Now the company's chief scientist Drew Major has changed tack. "Certain apps do very well on NetWare," he said, and the company is now adding services to make NetWare a better applications platform, and to optimise it as a Java application server. "Apps that are very input/output intensive, very management intensive, directory intensive or caching intensive — we are the absolute best platform in the universe to host those things," Major said.

So Novell is now in the business of selling a platform for such applications, and creating the software to show others the way. It's a business the company's recently appointed CEO Eric Schmidt (pictured) sees as "the next Wild West of the industry". "We've found a market that's totally new, and we will be the catalyst for it," he said. "That's why I'm at Novell." IDC figures project an \$US18 billion market for business-to-business networking products.

Major, however, realises there's work still to be done. "The reality is, we have to do some education for customers. They don't understand right now that there's a problem and this is a solution. They understand firewalls, they all know about proxy servers, but no-one sees the need to have it directory integrated as a complete solution... yet. But that's the opportunity."

Yet the opportunity will change Novell radically. According to Coleman Barney, the company's senior director of marketing for its Internet Access division, defining network services as the market the company wants to dominate means less is expected of NetWare, which will eventually decline in terms of the revenue it generates. "More of it will come from services," he predicted.

Given that Barney classifies Novell Directory Services, GroupWise and even NetWare's core file and print serving functions as such services, and that all are already or will soon be available as separate products, BorderManager may just be the new direction Novell has been seeking for so long.

Simon Sharwood



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Effective technology purchasing means deciding not just what to buy, but when to buy it.

Buying and life cycles

For any small business, equipment purchases are often driven by a direct need. More often than not this is the result of an immediate lack of capacity within the organisation, such as limited network printing options or slower-than-optimum communications capability. However, simply looking at the gap and filling it with product can sometimes produce less-than-effective results. Life cycle and optimum buying considerations are essential to a valid purchasing decision.

The solution to any upgrade problem often depends as much on the particular product life cycle as it does on a direct business need. Consequently, the business that rushes out and buys several of the cheapest (or alternatively the most powerful and newest) PCs, simply because it needs more capacity, may well be either storing up problems down the track or spending more than they need to. Either approach can be bettered by taking a look at both when and how to buy. According to research company IRB's Peter Hall, the most important factor is to ascertain what kind of equipment you need, and the best time to buy it — before you even think about buying.

"Any purchase depends to a degree on the technology you are looking for. Worrying about ongoing issues is not really a problem if you are looking at commodity products such as printers. The costs for these are really running costs only. But if you are looking at things like file servers or sophisticated network products, then the buying decision also becomes one of invisible ongoing costs such as network management, support and so on," he said.

The other obvious issue when it comes to making a purchasing decision is where the product itself is in its own life cycle. With product currency for items such as notebooks now down to as little as six months, the danger of buying off either end of the product life cycle is equally possible. Buying too early in the retail life period can lead to you being an unwitting guinea pig and encountering teething troubles you really don't need. Buying after the product has been around for a while ensures the stability of operation, but means you have lost the cutting edge to other, braver buyers. Buying somewhere in between is often the best option,

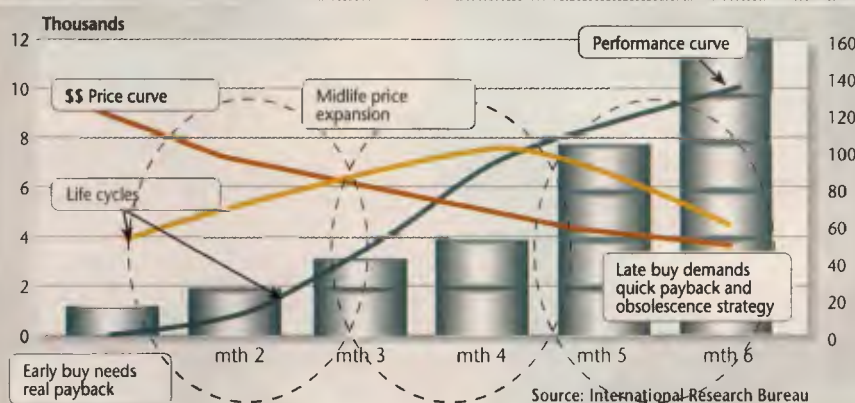
but this may carry a price penalty as the introductory offers have finished but the quantities sold have not yet enabled volume reductions.

"I always advise potential buyers to develop three to five-year life cycle buying plans," Hall said. "Just going out and buying on spec is not a good idea. Sometimes that bargain is not a bargain, especially if ongoing management issues mean 20% of your machines won't be working in two years. So you would have been better off spending more in the first place on newer technology and having fewer ongoing

may also command a higher initial price — although some beta programs and introductory offers may offset this. This argument can be countered by the perceived advantage of having the latest technology, however. Additionally, if your company has already tried and established a new technology — Web authoring is a good example — it will be well placed to capitalise on its early adoption.

Buying in the majority phase ensures a more established platform of security and standardisation, but can reduce the business advantage if you are operating in a

Technology S-Curve



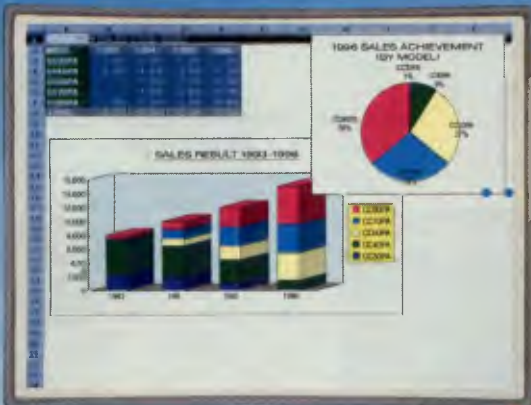
costs." Hall also advises factoring in the possibility of staff changes and economies in workforce when making purchasing decisions. Having a roomful of faulty machines with no technician to fix them is bad business in any company, whereas more expensive machines may well incorporate advanced diagnosis facilities that diminish the technician's role.

As well as product life cycle issues, you need to consider the way your business wants to buy equipment. It is well documented that the four basic types of buyer are technology hunters, early adopters, the majority and, lastly, the late adopters. While each has its advantages in terms of equipment and software purchasing, most small businesses would gain little benefit from trying to be one of the first two unless they are technology pioneers in their own right. Both types bring potential hazards in the form of untried technology, and

technology-rich market. However, the balance of long and short-term gains is usually best served in this arena. Established practice and support, stable pricing and some idea of general market acceptance are all factors in making majority-phase buying a safe bet. The last category, late adopters, will only ever gain in one way. This is a very valid one: they will pay less. There are, however, almost no other advantages to late adoption. Most late adopters accept the situation of having their current equipment or software one phase out of step with the rest of the business community — and possibly facing costly upgrades during the next development cycle. The ongoing support issue will be difficult to deal with, as will compatibility and servicing. But the initial outlay will be sufficiently attractive to some buyers to tip the balance.

Jeremy Torr

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LPF-3200 Liquid Crystal Projector

Forget passive surfing, Web-site design is an increasingly popular activity among the young.

Are kids taking over?

Unless you're a non-networked hermit, you would have noticed the increasing amount of content on the World Wide Web being produced by children and teenagers. What you might not have realised is just how good these new sites are. In many cases they're more professional than their commercial counterparts.

One of the pioneers of Internet content was himself a teenager. Roger Davidson, aka Teen Movie Critic, set up his site (<http://www.dreamagic.com/roger/teen-critic.html>) in early 1995 and looks set to be the champion of Net movie reviewers — well, at least until he stops being a 'teen'. Roger posts a movie review every day, each in his own trademark style. Fame and a near-celebrity status among Netizens have led to glory, over a million readers, and numerous profile articles in newspapers and magazines. When I asked whether he feels different as a result of all this, Roger replied, "Talking to millions of people all over the world can give you quite a rush."

While Roger is busy writing film critiques in Los Angeles, over in Washington, a kids' enterprise of a different kind is being run. It's GIRL, the Girls Internationally wRiting Letters site (<http://worldkids.net/girl/>). Monika, the president, founder and international chairperson, was away when I emailed, so instead I talked to Gina, who was happily acting in the executive role.

According to its founders, GIRL is the largest club for girls on the Net; Gina said they have "at best guess" around 1,400 members actively involved. As I wasn't allowed inside, I had to trust Gina when she told me that essentially they are facilitating "making friends and having fun — and maybe doing something good in the meantime".

GIRL has broken through a key stereotype about the online world. You don't often hear the words 'girl' and 'computer' spoken in the same sentence, but Gina said that GIRL has proven some old attitudes wrong. "Girls love the Internet. It gives us a way to communicate," she said.

GIRL is part of the sprawling World Kids Network (<http://wkn.org>), a non-

profit organisation dedicated to helping kids put content on the World Wide Web. The network's motto is "If you can dream it, you can do it." This is very true — for creative kids and teens, the Internet is a magical place that seems to have been made especially for them.

Clubs like GIRL aren't all based in



America. Another is TeenWorld, a Malaysian-based group that has a pretty whiz-bang site (<http://www.youthnet-ch.com/yni/ynihome.htm>). TeenWorld is a bit different to many online clubs: not only does it have a large Internet presence, it is also successfully organising real-life activities. Launched by the Penang Chief Minister, TeenWorld has an astounding profile in its home country, organising everything from cocktail parties to Teen Net Days.

But it's not all fun, fun, fun. Youth Net Inc (<http://www.youthnet-ch.com/yni/ynihome.htm>) is a Web design company, run by teens, that is trying to create a viable business in Internet design services. It is a very good example of the kinds of things teenagers have wanted to try, but have never had the chance to do. It just needs some fine-tuning in its design principles.

Of course, once you have someone to design a home page for you, you need to put it on a server with a full-time connection to the Internet. There's a kid who can do that for you too. His name is Michael Novello, and he is the 14-year-old managing director of StarCrow Internet Presence

Providers (<http://www.starcrow.com>). StarCrow supplies server space, email addresses, and even domain names at "competitive rates" to the children's market.

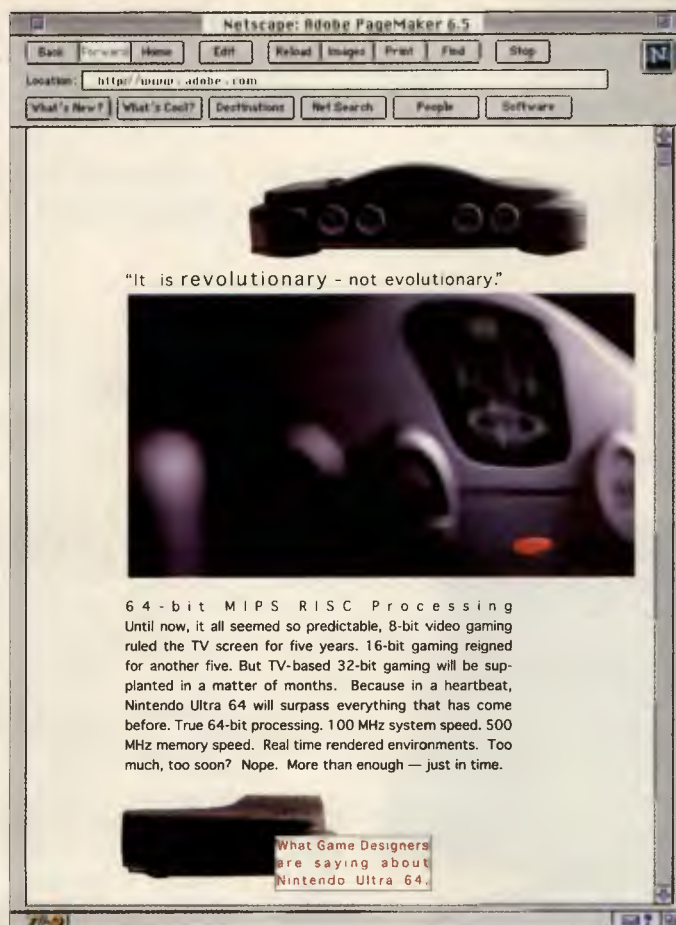
I found Michael through the Microsoft Internet Start Page, for which he had written an article on how to set up a business over the Internet, aimed at kids like himself. I asked him to elaborate on the StarCrow motto: Leveling the playing field. "Now, with the World Wide Web, kids can get involved on the Internet just as much as big businesses can," he said. "On the Internet, how you go about what you do is what makes the difference, not how much money you have." Michael believes that many of the kid-based enterprises have risen above other companies that have been around for years. "Success is based upon whether or not you make the right decisions."

Other groups of teenagers are more radical. Peacefire (<http://www.peacefire.org>) is a group that has garnered an international reputation lately for its struggle against Internet software 'minder' programs designed to block offensive material being made available to children. Peacefire shows that, if children put their heads together, they can fight for a cause as well as or better than anyone else.

People like Gina, Roger and Michael are showing the way for others to follow. When I asked him what inspiration he can give to other budding teen content creators, Roger said, "Let your voice be heard — the Net is the perfect tool for that. And you don't just need to . . . be heard in your city, state or country. You have the entire world for that. That's what makes the Net so fun and interesting. Communication . . . is no more than a keyboard away."

Nick Moraitis

Nick Moraitis is the 14-year-old Webmaster of the Teenage Computer Network (<http://worldkids.net/clubs/tcn/>).



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*Just when does a computer system
become obsolete?*

Trash or treasure?



about 1.4 million PCs were bought in Australia in 1996. The majority of these were purchased as replacements for existing systems that ended up in landfill themselves after being thrown away.

Not only does this practice add to the mounting pollution and waste problems faced by Australia, but it is also an unnecessary drain on resources, according to a report on waste minimisation from the National Centre for Design at RMIT.

Short Circuiting Waste from Discarded Electrical and Electronic Products found that computer waste is often hazardous, and the materials used and ultimately dumped are precious and scarce. It recommended that the various state governments adopt waste-minimisation strategies, including better recycling initiatives and policies promoting the sale of long-life, upgradable and durable products.

At present, a decision to keep and upgrade an old system can be expensive and difficult to implement. Often, adding RAM, replacing the motherboard or upgrading the processor is not worth the performance increases gained, nor the hassle in trying to physically get it done, we are told. These systems just won't run the latest 'necessary' software, we are warned.

Also, with a glut of vendors in the market creating competitive prices for new, speedier systems, users are often enticed to replace a perfectly serviceable machine.

So you buy a new machine, and you're happy with the purchase, but just what do you do with the old equipment? There are a few alternatives, particularly if you are based in Victoria.

Remember that what is an archaic system to a technophile, or an ineffectual piece of outdated plastic to a business manager, may be a treasure to someone or who can't afford a new PC or who doesn't need the latest and greatest technology to achieve work productivity.

This is the premise behind Project Recycle, a Victorian initiative that involves collecting unwanted but serviceable PCs and passing them on to community organisations or people with a disability.

Project Recycle is a program of the Vic-

torian Council of YMCAs, and you can donate PCs and printers, but not software. Organisations or individuals wishing to obtain equipment need to apply, and pay an administration



fee: \$25 for a 286, \$50 for a 386, \$75 for a 486 and \$25 for a printer.

Project Recycle aims to supply only systems that suit the user's needs, and as such is not a warehouse for dinosaur machines or empty casings, said Peter Burns, director of community and youth services at the council. It will pull apart obsolete machines and upgrade them where possible, and it will also recycle all possible scrap metal in the process.

Another option for Victorian-based businesses is MRI Australia, which recycles PCs and mainframes for profit. Hardware such as power supplies, memory, some chips, cases, muffler fans and colour monitors can all be reused. In some cases, equipment is refurbished and resold overseas. APC is unaware of any similar services in other states.

If you have a system that no longer works, it can be dismantled and the scrap metal and plastics collected. EcoRecycle Victoria distributes a free booklet, *The Waste Reduction Network Directory*, which lists organisations in Victoria that will collect (and sometimes pay for) scrap materials. In other states, try contacting your local council for the appropriate services.

Designing for the future

It is unlikely that recycling or reclamation processes were considered in the design process of older PCs; however, more and more manufacturers are designing systems to be reused, or at least promoting a greener image. APC asked the top three vendors in Australia, Compaq, Apple and IBM, what efforts they were taking to aid recycling and reuse.

While representatives from all three companies APC contacted supported the concept of recycling, it was difficult for each Australian arm to talk about company practices as all were based on planning decisions made in the US. Unfortunately, Apple was unable to supply APC

with information on its recycling practices in time to meet our deadline.

Only general information was available from Compaq, which developed Design for Environment guidelines in 1994. These are said to aid product planning, design and manufacture for making products not only upgradable recyclable and reusable, but also energy efficient. Portions of Compaq's computers can be recycled, as it uses recyclable plastics, and all recyclable parts are labelled for easy sorting. No information on Design for Environment could be found on Compaq's site, although it does list a few places in the US where goods can be recycled.

IBM has had an environmental policy in place for 20 years. The policy mentions objectives such as providing recyclable machines using recycled products. The AS/400 Advanced Series high-end model uses a plastic resin containing 25% recycled content in the operation panel bezel. IBM has established a US centre for disassembling and reusing end-of-life equipment. In Europe, IBM has programs in 11 countries to handle end-of-life products.

As product take-back policies are refined, more opportunities such as these should arise in Australia.

Selina Mitchell

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Thomas Dolby: He blinded me with Java

Electropop wonderboy Thomas Dolby was a pioneer in the early '80s, blending computer technology with musical creativity to come up with hits such as 'Hyperactive' and 'She Blinded Me With Science'. Now known as Thomas Dolby Robertson, he sees his latest venture as yet another exciting chapter in his life.

By Dan Tebbutt

Dolby leapt back into the spotlight at April's JavaOne developers conference in San Francisco, joining Sun CEO Scott McNealy onstage to announce that JavaSoft was licensing sound technology from HeadSpace, Dolby's Silicon Valley start-up. HeadSpace's application programming interface, called JavaSound, will be integrated into the Java language, bringing cutting-edge sound capabilities to the emerging platform.

Dolby demonstrated the impressive creative power that HeadSpace's software will lend to Java. From a server in France he called up the MIDI sound file of a Bach harpsichord piece. Next he borrowed an exotic oriental instrument from a Japanese Web site, then proceeded to inject this into the main file — causing the Japanese instrument to play Bach's score in real time. Displaying true Java cheek, Dolby then went to a server in Microsoft's hometown and loaded canned applause to honour JavaSound's abilities.

From 'Hyperactive' to hypermusic

Just how did a guy like Dolby end up fronting a Silicon Valley software house? "There's always been a very strong technological component in my music," he told *APC* at HeadSpace's premises. "Bear in mind I started making music before there were PCs."

Dolby first started playing around with computers in the days when soldering irons and a strong practical science background were essential skills. "It was wide open for experimentation," he said, telling how he crafted a drum-programming system out of a disco-lighting console and synthesisers, then used it to play the beats on his 1983 hit, 'She Blinded Me With Science'.

Along with Peter Gabriel and Kate Bush, Dolby was one of the first musicians to use the "legendary" Fairlight CMI sampler. This Australian-made contraption allowed techno-savvy musicians to incorporate novel sounds into their songs — but it cost \$200,000. "You can get similar power for a few hundred dollars now — it's accessible to a far wider range of people. But it was great to be right there at the vanguard of that technology," Dolby said.

Buying his first Macintosh in 1985 was a revelation. "I've always had a soft spot for Macs, like many creative people, and something of an allergy [to] IBM PCs," he said. Off-the-shelf software made the creative process much easier, but as the leather-tie decade drew to a close, Dolby was looking for new territory to explore.

He became involved in a project with the Guggenheim Foundation to create a virtual-reality Mozart string quartet. "Suddenly, I realised that all the software I had been using on my PC was designed for linear playback of music," said Dolby, who recognised the gulf between straight musical playback and the dynamics of recording and reworking a song.

"We use MIDI sequencers that are the musician's equivalent of a word processor . . . You can very easily chop and change and cut and paste things around — you can reformat and restyle things. You have this non-linear approach to creation.

"[As with] a word processor, the eventual output is usually linear. If you use a word processor to create a Web site, you're outputting non-linear content because it can be resized, it can be reformatted, you can hyperlink off.

"The Internet has created a distribution medium for non-linear media. So it seemed to me there needed to be non-linear music on the Internet, yet all the music I heard on the Internet was still linear — someone had taken a recording that existed, crunched it



down and used a streaming audio plug-in to send it . . .

"Just as there is hypertext for text, there needs to be hypermusic for music."

As his JavaOne presentation proved, Dolby's team has put down code to make hypermusic more than a mere buzzword. Another prototype was created by devoted windsurfers at Headspace. San Francisco Bay is lined with weather buoys that report wind conditions to the Internet: Headspace engineers graphed this information then "sonified" it "into a musical symphony" that howls for attention whenever favourable winds start blowing.

Hypermusic opens up new avenues for musical collaboration and radically different relationships with fans, Dolby believes. "Musicians have been intrigued since CD-ROMs started to appear with remixable music, [but] the majority have not had the ability to make their own CD-ROM and release it," he said. What's "captured the imagination of a lot of musicians" is "the idea that instead of making a finite piece of music you create a piece of music that continues to evolve over time or that even allows the audience to interact with it."

"Because of the relative democracy of the Internet, it's possible now for any musician to try their hand at making interactive music," he said. The general public will enjoy a greater wealth of online music, and most of it will be free.

The Beatnik beat

The beauty of Headspace's technology is that it was designed specifically for musical integrity. "You're not making do with a 'dumbed down' version. The music you're hearing is exactly the way the composer heard it, not a compressed version . . . It is genuine Internet music for really the first time," he said.

In addition to the audio engine licensed to JavaSoft, Headspace offers Beatnik, a browser plug-in that delivers the play-back technology in traditional platform-dependent implementations, as well as Beatnik Editor for creating and editing hypermusic. The format, called RMF (rich music format), is a hybrid that can include both MIDI and WAV sounds, but Headspace claims it's more efficient because of its 'lossless' compression algorithm.

The Beatnik Web site contains examples of what can be done, including an 'interactive harp' that browsers can actually play and hear. "Those are just some showcase content examples that we've created," said Dolby. "I wish we had more time to create actual content using our technology but

there's a rush to create the core technology, license it and get it out in the industry."

And Headspace was Johnny-on-the-spot when it came to licensing. The April deal formally anointed Headspace's audio technology as the official sound API for Java — potentially the biggest platform opportunity this side of Windows. "I liked the idea of Java because I saw it at the beginning as the OS of the future," said Dolby.

Java still has a long way to progress before becoming an attractive multimedia environment; it needs video, 2D and 3D graphics, sound and more. The way Dolby tells it, Sun realised these aspects were not its core competencies, so about a year ago, JavaSoft set out to find industry-leading technologies to integrate into Java.

"The timing was very good when they met Headspace because, although we were not Java-based at the time, the basic philosophies were a very good match. We'd been doing business in the area of making compact and efficient software audio engines for people like WebTV." He explained that the Headspace Audio Engine was "not dependent on a sound-card or DSP [digital signal processor] chip. This made a lot of sense for integration into Java. The fact that we're a small company moving very fast [meant] we were like a tornado waiting to touch down. The perfect vehicle for us really is Java."

JavaSound plays key industry-standard sound formats (WAV, AIFF, MIDI, MOD and AU) plus RMF files. JavaSoft will assume final control over the JavaSound API, but Dolby indicated Headspace plans to market a resource library to encourage developers to integrate sound into Java applications.

"The philosophy behind Java is a very good one," Dolby said. "Inevitably there'll be a multitude of different devices that don't look much like PCs. Java was designed to be a language that was very scalable and that could accommodate everything from huge intranets to light switches and toasters."

Does this mean we can expect Java in synthesisers and drum machines of the future? Dolby expects so. "The Java Virtual Machine, once it has our sound engine integrated into it, would be an absolutely ideal way to go for a small keyboard or sequencer. Musical instrument hardware manufacturers should take a serious look at Java."

Java's ubiquity coupled with the Headspace engine's high fidelity could add up to an enticing proposition for musicians seeking novel distribution channels. Dolby is critical of PCs' musical abilities to

date — different soundcards produce different output quality and many streaming protocols deliver low-grade playback.

"Java has the potential to guarantee the fidelity of a piece of music anywhere that Java plays," he said.

"Java also has a high concern for security," Dolby said. "That's important for musicians because we're very sensitive about the copyrights in our music." Musicians are concerned about the popular illusion that sound files found online somehow become public domain.

In light of developments like the claim against ISPs by the Australian Performing Rights Association (APRA) last year, JavaSound's copyright aspect could prove particularly appealing.

Musicians tackle the Net

Dolby believes the Internet will radically revamp the dynamics of professional music. In his "blue-sky scenario", the Net will serve as a direct communications channel between musicians and their fans, since both artist and audience work with essentially similar computer technology.

The implications are tremendous. For one, it means songs can be distributed the moment they're finished, rather than a year later. This can liberate artists from a rigid timetable of studio time alternating with road time.

Secondly, it means fans can pay just a few dollars for a single song rather than needing to buy a complete album. Dolby even suggested an online 'jukebox' approach might be possible where listeners pay a small amount to add a song to their playlist. "You don't need to own a physical copy," Dolby said. "The potential is there for it to be a better deal for the artist and the audience by cutting out the middlemen. The Internet promises to really change the economic model and the lifestyle of musicians."

As for himself, Dolby wants to see Headspace technology bear fruit — but ultimately he moves to a different beat. "I'm not sure whether running a business is something I want to do forever: it restricts me from being a free creative spirit. It's something that I could do for a period of time until I see that the work that I've done is on a path to success and is going to make an impact."

"In due course, I'll back off from running the company and spend more time making music again, being a family man, being a human being. Right now the idea of booking into some smoky little club and playing piano ballads sounds like a vacation!" ■



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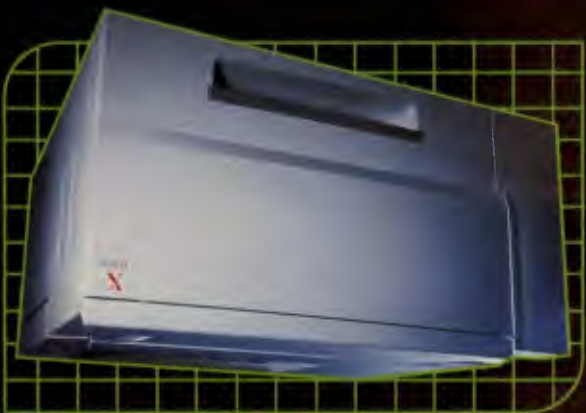
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POLICE AND THIEVES HACK ATTACK!

COMPUTER HACKING, BOTH PRE AND POST-INTERNET, HAS LONG SPAWNED AN ARRAY OF PREVENTATIVE MEASURES BY CONCERNED ORGANISATIONS. WHILE THE CURRENT PROLIFERATION OF ONLINE COMMERCE PLACES SECURITY HIGH ON MANY CORPORATE AGENDAS, THE GIG IS FAR FROM UP FOR TODAY'S MODEM-TOTING VIGILANTE.

Once, your average computer hacker was a budding scholar with a thirst for knowledge. Nowadays things are much more diverse: the Web is a mere research tool for some, while for others it's a futuristic weapon. The common frontier is the security firewall.

Hacking today can encompass anything from sabotage (flooding a system with bogus mail or threatening emails) to crashing an entire system, downloading pirate software and games, trading codes via bulletin boards, manipulating SP Internet accounts, and credit-card fraud.

The power of Web-linked information is serious business. Bedroom activists high on Jolt cola are only the tip of the iceberg. Within international military spheres, information warfare is the new battleground. Defying the regular bombs-and-bullets approach, it involves the systematic disruption of the enemy's financial, transportation and communications networks via hacking and electronic sabotage.

Last year the US Department of Defense added the testing of information warfare techniques to its conventional regime of military manoeuvres for the first time. Technically, data warfare usually involves infiltration of IP packet protocols, whereby they are hijacked during user transmission and loaded with hidden commands so as to cause massive network damage or a major system crash. Packets can also masquerade as authorised internal users so as to gain access and wreak havoc.

Commercial sabotage is another hacking by-product that's on the increase.

THE MESSAGE IS CLEAR — TODAY'S HACKER MAY BE CAUTIOUS, BUT AS WEB TECHNOLOGY BECOMES INCREASINGLY SOPHISTICATED AND DIVERSE, SO DO THE MEANS TO UNDERMINE IT.

Provisions of the Computer Crimes Act

The Computer Crimes Act 1992 operates at both state and federal levels. In broad terms, it relates to anyone who gains intentional and unauthorised access to another computer, or some associated criminal action.

- Under section 76C, a person who erases or alters data, interferes with or obstructs the lawful use of a computer, or prevents access to data stored or provided by a facility operated or provided by the Commonwealth or by a carrier, is guilty of an offence and may receive a 10-year gaol term.
- Under section 76D, a person who intentionally or without authority obtains access to either data stored on a Com-

monwealth computer or "data stored on behalf of the Commonwealth in a computer that is not a Commonwealth computer" is guilty of an offence and may be imprisoned for up to six months.

- A person who defrauds another, or who gains access to data stored on a Commonwealth computer, or gains access to such data via another computer for purposes of examination, is liable for up to 10 years imprisonment.

- Under section 85Z(e), a person who uses a telecommunications device to menace or harass another person could be liable for up to one year in gaol.

Craig Stephens

Over recent months, at least a dozen US organisations have closed down servers due to hackers sending hundreds of bogus requests for information per second. *The Times* newspaper in the UK highlighted surprising corporate vulnerability in May this year, reporting that several banks in the UK had paid millions of pounds since 1993 to blackmailers who could crash the banks' systems at will.

Gaining an identity

Futuristic warrior or adolescent vandal? Hacking is the realm of the diametrically opposed. While some see it as a means to confront the roving eye of predatory corporations, for others it is a chance to join their payroll.

Twenty-two-year-old 'Alvara' is a self-confessed hacker, "cyberchick", and a big fan of body piercing and vegetable-dyed hair. A distinctly '90s "Net feminist", she has much faith the Web's ability to "empower" its subjects. "This is the infor-

mation tool of the moment and although there is a lot of shit online, you can hack through it all and make your own world and time zone. You're not just this passive victim, waiting in line to consume."

Alvara claimed that female Web reactionaries are a much-needed commodity. "We are keen to subvert not only corporate networks, but also the mindless commerciality of the Internet, and its bias towards male power play."

Whether they are fuelled by technological addiction or some sort of obsessive disorder, many of her friends wind up spending hours every week "honing their skills" in dingy bedrooms, cracking corporate codes and systems, all in the name of exploration.

Asked whether the proliferation of electronic commerce would see her attempting to procure funds online, she confided, "Some of my friends have had their gear confiscated for using bogus accounts with service providers. I really don't think it's worth the trouble now, considering the sign-on rates are so cheap. There [are] also

more and more really young kids getting into it, which can be really off-putting if you were there first."

Seventeen-year-old Andrew hails from the new school of hackers. A Year 11 student at an exclusive boarding school in Sydney's eastern suburbs, he started his hacking career at the age of 12, logging onto bulletin boards, familiarising himself with the Net and chatting on Internet Relay Chat (IRC). Andrew may not have been there first, but he embodies the sentiment of the new generation. His peers are fanatical about new technologies and keen to accept commercial ideals. They have experienced computer technology from an early age. Andrew wants to finish high school and start a career in IT, aiming to be a network manager or programmer. He said he has already turned down an offer with the connection-faults department of a key Australian ISP. He now uses his computer three times a week for three hours at a time. Five years ago he was equipped with a 386SX with 2M of RAM and a 9,600bps modem. Nowadays he cruises the Net with a Pentium 100, with 24M of RAM, two modems (14.4Kbps and 28.8Kbps) and, of course, an ever-present mobile phone. He also has the use of any one of a bank of 40 modem-linked Macs or PCs at school. "I didn't really start with the idea of hacking. I was just looking around via the Internet and noticed mistakes that programmers had made. Typically I'd see a Web browser coming up with an error that would enable me to gain access. When you're looking around at things you tend to notice systems that are wrong and in turn want to look into them."

Adolescent bravado seems to fuel much of the hacking done by Andrew and his peers. After visiting a bulletin board he will often stumble on a message about an interesting Web site. Another hacker

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Finders keepers

When Danish security firm CaboComm noticed a security flaw in Netscape's browsers, it wanted more than Netscape's standard \$US1,000 plus a T-shirt bug bounty.

Netscape officials have said that Christian Orellana, head of CaboComm, notified the company of the bug then demanded the company pay an amount described as 'exorbitant' in exchange for further information. Orellana has said he felt he'd found a major flaw, worth more to Netscape than its standard finder's fee.

In an email sent to Netscape, Orellana wrote, "I cannot reveal much more detail without giving away the bug, which I will not do, since I think this information is so valuable to Netscape that it should be worth a good deal of money. The information is certainly worth a bit on the free market, and I am currently awaiting responses from other parties. In other words, I think the person most suited for handling this is someone in charge of the company checkbook."

Orellana then turned the information over to CNN, realising he would get no more than the standard bounty, if you believe Netscape, or "to inform the public about the possible intrusion on their privacy", if you believe Orellana.

As for his demands for more than the \$1,000, Orellana says he would have dropped the condition if Netscape had come to Denmark to collect his information, as he was reluctant to email the information, according to a report in NEWS.COM. Orellana said he subsequently released the details of the bug to Netscape, although Netscape officials disagree. A week later, Netscape had released the fix.

The security hole, which affects Netscape Navigator 2.0 and 3.0 and Communicator 4.0, allows Webmasters to capture files from the local hard disk of a visitor to that page if they know the name of the file. A page author wishing to steal a file from a visitor's system may do so using conventional facilities available in the default configuration of the browser.

Some critics have said that Netscape caused the problem by offering rewards in the first place, as paying bug-finders creates the expectation that the information belongs to the finder, and may be used as the finder sees fit, rather than belonging to the company that has developed the product. As such, it was only a matter of time before someone tried to up the price.

Other companies offering Web-based products, such as Microsoft and Sun, do not offer incentives for bug finders.

It certainly seems that the 'brothers and sisters in cyberspace' ethos that characterised the Internet is over. Bug finders' motivations now need to be questioned. Discrediting a competitor was the motivation behind Sun's hiring of a programmer to develop a program that exploited an ActiveX security hole demonstrated at its Java One conference in April.

In addition to the money, Orellana's exposure of the bug in such a public manner suggests he appreciated the publicity value of the stunt for his security company. Although he won't be getting any money, and he comes off looking like the bad guy, it certainly won't hurt his business.

Dominique Jackson

might state that they can't get into it and will challenge others to enter.

"It's then just a process of basically hacking into systems. You can get software programs that can decrypt files. Sometimes there are 1800 numbers tied to a PBX with codes you can get through with a random dialler."

Some of the more personal information Andrew has seen via hacking includes driving records and driving histories that have been left unguarded in systems, he claims. "You can easily get hold of the driving tests from the RTA. Other businesses keep records of everything that was bought over certain periods; if these files aren't encrypted you can then gain access to credit-card numbers. I just wonder why people try to hide things. What's the point?" Andrew admitted to having an interest in spies and espionage. He said he'd like to emulate the efforts of an English hacker who managed to source information about British spies by manipulating a British phone company's system. He listed his favourite hacking-related Net sites as the CIA (<http://www.ic.gov>), the US Department of Defense (<http://www.def.con>), and an endless range of hacking-related bulletin boards that provide candid details of hacking tools and instructions, and loopholes in other bulletin boards and Unix systems.

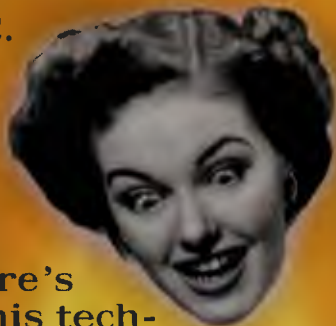
"I've spoken to some people in the US who have been arrested for defrauding telephone companies. They also got done for having pirate software on their PCs when the FBI came around," he said.

"I wouldn't look into the credit-card side of things, as you'd probably have the Feds at your door the next day. No matter what you do with a computer, you always leave an electronic trail, and no matter how well you try to cover that, sometimes it's just not good enough." Andrew said many of his peers were keen to explore the recently-established Digicash Web page, a digital bank presently

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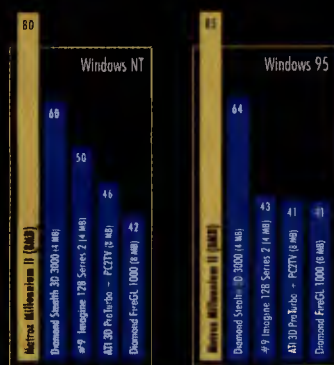
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being trialled on the Internet by the Advance Bank. "If somebody got in there they could have access to a lot of money."

Andrew sees himself as an explorer. "Basically, it's just curiosity. We seldom change or tamper with vital systems. It's more often just a matter of having a look. It's not the hackers who damage the sites, it's the criminals who know how to hack who do the real damage."

Criminality?

Seventeen-year-old John Perez received a rude reminder about the nebulous divide between hacking and crime when Australian federal agents paid an impromptu visit to his home in suburban Wollongong late last year. Now 18, the then high-school student was charged with multiple counts of unauthorised access, two counts of improperly inserting data and various charges of credit-card fraud. He received a good-behaviour bond and 100 hours of community service. His equipment was also confiscated and auctioned, and all proceeds from the sale went to the federal government. Over six months, Perez had obtained the password of a student account on the Sydney University system and several account passwords at Wollongong University. He was then dialling in through Wollongong University, connecting via Sydney and chatting on IRC.

Steve Tolhurst, network security officer at the University of Sydney, helped to 'bust' Perez after he and federal agents tracked him over the six months. "It took us a couple of months to figure out who he was, then it was just a matter of collecting sufficient evidence," he said. Perez was caught red-handed after Federal Police issued a warrant, allowing Telstra to record details of outbound calls from his home number. Monitoring facilities were then set up, with Tolhurst and his team equipped with a pager notifying them whenever the accounts Perez used were activated. They waited in a cafe, screening the pager before calling at his home.

Tolhurst sees hacking as losing momentum within the sheltered environs of academia, as opposed to the outside world. He attributes this slowdown to the Web's continued mainstream acceptance and its waning 'underground' appeal. "I think it has probably passed its peak. Since Perez it has been fairly quiet, and most of the time it's just a student trying to save the \$30 sign-up fee. In the end the Internet is a medium where news travels fast. If we can get a conviction, everything goes very quiet over the following six months."

Not all hackers are reckless adolescents with a naive fascination for chat lines and dirty pictures, nor are they granny-scaring subversives with a mania for industrial sabotage. With wholesome career objectives high on their agenda, many would sit comfortably among the ranks of any IT multinational.

David, a 27-year-old "seasoned hacker", is now employed in the R&D department of an ISP. He believes the knowledge he acquired over the years as a hacker actually helped him to impress his bosses and secure a job. "Ten years ago hacking was simple; anyone could do it," he said. "These days it's just not that easy, there are all sorts of individually-crafted

"In the end the Internet is a medium where news travels fast. If we can get a conviction, everything goes very quiet over the following six months."

security systems, so there's often no way you can get through. Then again, because technology is moving so quickly, the systems can't always be perfect, so there will always be loopholes to exploit." David contends that today's firewalls are of little consequence in the path of an experienced hacker.

The majority of firewall products currently available fit into two loose categories: gateways and packet filters. Packet filtering routes Internet Protocol (IP) packets based on a packet's originating address. In theory, a packet is accepted only if it originates from an authorised location, though much hacking aims to confound such logic. A basic loophole lies in the fact that an IP address can be spoofed by a hacker, who will emulate or change it so that it appears as if it came from within an authorised system. Part of the TCP/IP protocol suite, an IP address contains four sets of numbers that identify the network the user belongs to and associated devices within that network. This code may be penetrated by posing as a PC inside a network, and in turn emulating a sequence of IP numbers. A network router will then read the packet as an internal one and pass it through into the LAN network.

Known as compressing codes, or a Trojan-horse attack, this process also involves embedding code inside a packet that can be mistakenly accepted by a firewall. When this packet penetrates the network, it carries encoded information or messages that may cause severe damage both

to data and an entire system. Inside mail, or Unix-to-Unix copy programs, are often targets for this type of attack. Both may accept mail that carries detrimental instructions. Because it is attuned to raw data, the firewall will often fail to see the finer details of the accompanying code.

A 'masquerade attack' causes the replication of a host response socket number, a number automatically created when a line of communication between a network and a user commences. This number is replicated via prediction or a link with an internal system, and the incoming path of a user is then barred by the hacker using this information. The user's connection or communication path is subsequently

taken over by the hacker. David revealed that one of the latest security buzzwords he and his peers had come up against was 'tunnelling': the concept of using encrypted IP packets to create a virtual private network. "Tunnelling is used to safeguard individual networks within an organisation and is usually adopted by companies that want to connect two LANs separated by a great distance.

"With tunnelling, the networks are connected via the Internet firewall to firewall, and data is sent through encrypted IP packets. Although it is the latest whizzbang product that is supposedly impenetrable, there are openings a hacker could easily exploit, such as the sequence of encryption keys."

The law

ISPs and corporate organisations remain characteristically tight-lipped about security breaches, usually offering an awkward 'no comment' to approaches from the media. Despite the latest encryption technology being widely regarded as impenetrable due to the huge volumes of time needed to crack it, a US embargo on high-calibre encryption technology has placed it out of the reach of Australian business.

Computer-crime offences fall under sections 76A, B, C and D of the Commonwealth Crimes Act, which come under the scrutiny of the Australian Federal Police (see sidebar on page 72). With four staff in

Sydney and eight in Melbourne, The Federal Police Computer Crimes Unit is responsible for all Commonwealth computers and computers that store Commonwealth data. According to Senior Federal Agent Graham Henley of the Australian Federal Police, NSW Computer Crimes Unit (CCU), hacking has become an increasing problem for his department over the past 18 months, particularly within the public realm, outside the domain of academic institutions. "Most people I speak to are aged between 24 and 32. These are the second generation of computer users, and their level of expertise has progressed to the hacking stakes. The severity of their crimes is usually measured by three main criteria, including what the person has done, why they have done it, and what they are gaining from it."

Henley said that the CCU is presently investigating at least one hacking-related report each week, with a reported matter assessed as to its severity by the department's management committee. They then determine whether further action will follow. If action is decided upon, a period of surveillance will ascertain a hacker's operating pattern. "A hacker will usually use the same point of entry more than once, so an entry into systems can be identified in stages," Henley said. "With the help of the carriers, you can work backwards through the link of computers and observe the initial in-dial port or modem, where the offender can be identified."

Federal Agent Chris Butner, also with the CCU, said most crimes involved entry to SP systems to infiltrate accounts, with some hackers attempting access at supervisor level. He said flooding systems with email was also an increasing problem. "There have been some instances where there are 5,000 email messages, each 2M long. They cause absolute chaos in a system when they are downloaded, and can actually bring a system down."

Butner said Australian legislation and laws governing the Internet are in dire need of reform. "They don't properly address the scenario that we are going towards in 2000. Most of our laws address things that are physical; they don't recognise the levels of knowledge that are present nowadays and things that you can do by unlawfully applying that knowledge."

"Copyright [is] well and truly covered, though areas such as electronic commerce issues are not. I think there is far too great a burden placed on any law-enforcement agency, whether it is federal or state, in

terms of the lengths it can go to via the existing legislation."

The subject of electronic commerce raises genuine concerns while, surprisingly, the old line about credit-card numbers gains a cynical response. "The question of credit card numbers is something people often equate as being a prime area of our operations, but it isn't. I think that the hype regarding credit cards and the fear that has been instilled by the press exaggerates the severity of the situation," Butner said.

While many hackers see themselves as simply obtaining knowledge, Agent Butner perceives the psychology behind people who hack as something decidedly more insidious. "In many ways, some of the people that espouse that sort of theory are very careless in how they obtain that knowledge. It is a very self-serving philosophy that can cause a lot of damage to others — somewhere along the line someone is compromised."

"You can't phreak or hack without costing someone, whether it's a service provider like Telstra or Optus, or an individual or small business. These things cost everybody, so you have to maintain a clear picture of the criminality associated with these actions."

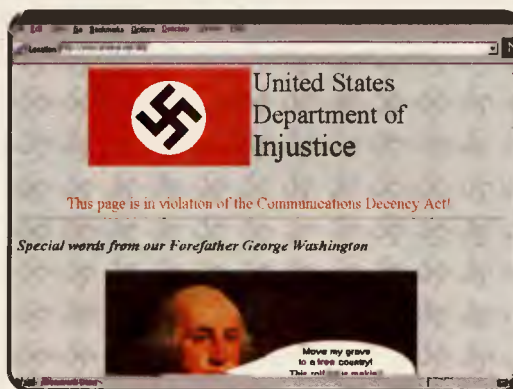
Official hacks

The Victorian government suffered an embarrassing attack of Web vandalism in May, as a rash of hacks into US government sites spread to Australia. Hackers put 'for sale' signs on maps of Victoria and changed the banners on the main page to read 'Victoria on the take' and 'Victoria, the State of decay'. The site was taken offline.

In the US, attacks were made on the Web sites of the US Department of Justice and the CIA. In August last year, the US Department of Justice site was defaced by swastikas, nude photos and other offensive material. The hackers tried to get their anti-censorship stance across by changing the home page to read 'Department of Injustice' and including the words 'Big Brother is watching you! Hail your new master!' and 'The Department of Justice serves to punish all who don't agree with the moral standards set forth by Clinton.' The hackers also expressed concern about wiretapping, unwarranted searches of private property, and the removal by government of citizens' rights to freedom and free speech.

The attack was praised by some Inter-

net activists for demonstrating how ineffectual the Department of Justice was in regulating activity on the Net, although comments posted in the Fight Censorship



news group said the hacking damaged the credibility of the cyber-rights movement and would prompt the government to pass stricter Internet regulation laws.

One month later, the banner of the home page of the CIA was changed to Central Stupidity Agency by a group calling itself Power

Through Resistance. The hackers replaced the CIA's page with a parody that included obscenities and several links to various Internet sites, including Playboy, Hackerz.org, Flashback Magazine and the Swedish Hackers Association. Also featured were the words 'Stop Lying Bo Skarinder!!!' referring to the Swedish prosecutor acting for several telecommunications companies pressing charges against five computer hackers in a case that had opened the previous week. The site was shut down and reopened about a week later.

Partly in response to these hacks, in October US president Bill Clinton signed the Economic Espionage Act giving law enforcement more power to crack down on hackers. In all cases, the hackers didn't get access to private information but simply defaced the home page.

Copies of the hacked pages are at <http://www.skeve.net/doj/>, <http://www.skeve.net/cia/> and <http://www.skeve.net/vicgov/>.

Dominique Jackson

AUSNet hack

The search for Optik Surfer

One of the most prominent Australian hackings was the April 1995 attack on ISP AUSNet's site. This case received a lot of attention because it was leaked to the media and because it occurred at a time when Internet access was becoming mainstream without a lot of information available about the security risks.

AUSNet's site was hacked by a person or group of people identified as 'Optik Surfer'. Optik Surfer lifted the details of some 1,200 credit cards which it published to journalists and other ISPs as evidence of the security hole. In addition, Optik Surfer defaced the company's home page.

The loss to AUSNet from the hack has been estimated at between \$60,000 and \$2 million, although at the time, AUSNet's then general manager Tom Koltai admitted the hacking had been good publicity. In May 1995, an independent security audit was conducted on AUSNet's systems and procedures and AUSNet temporarily lost its merchant facilities.

The hacking was investigated by the Computer Crimes Unit of the Australian Federal Police, which confiscated a computer from Internet consultant Skeeve Stevens' house in October 1995, and charged Stevens with 13 offences including unlawful access to data in a computer, unlawful insertion of data into a computer system, obtaining benefit by deception and possessing child pornography. Stevens, who pleaded not guilty, was released on bail and is currently awaiting trial in October. "They're going to lose," he said. "They needed someone to hang it on at the time."

According to Stevens, he was targeted by AUSNet and the federal police because he had heard of the hacking and helped expose the security flaw to the media. "I was never a hacker," he said. "I'm not a programmer. I can barely program my way out of a paper bag."

Perhaps in response to the hacking, AUSNet has developed Oyster, 128-bit encryption technology, which it launched in March this year. AUSNet's general manager, Doug Ruttan, declined to comment on the case, saying he had only been with the company for six months.

Dominique Jackson

The world's largest computer company pays a team of hackers to break into corporate networks — with good reason. By Dan Tebbutt

Hackers with (ethical) attitude



You'd expect the Internet's reputation as a hacker's playground to induce paranoia among Webmasters responsible for high-profile sites. Yet almost weekly we read how hackers graffitied the home page of organisations as august as the CIA, the US Department of Justice, the Los Angeles Police Department and the Victorian government (pictured). Sometimes these incursions represent the triumph of hacker cunning — but all too frequently embarrassment stems simply from the lax application of well-documented security precautions.

Can a Web site ever be made safe? It's a question that preys daily on the mind of Dr Charles Palmer, who heads up the Global Security Analysis Laboratory at IBM's Watson Research Centre outside New York City. The members of Palmer's

"Consulting evaluates their systems and procedures, tells them a few things up front, and then if the customer wants all-out attack, Global Security Analysis Lab will mount that attack. It takes various forms depending on what the customer wants, [including] all-out, no-holds-barred attack on anything that the company owns, which we always advise because security is only as good as your weakest link."

"If you have all these machines up front that are supposed to protect you, they may be perfectly secure, but if you have other machines — perhaps in subsidiaries in other parts of the world — that are unsecured, if we can get in that way we will. And if we can, you know that some of the bad guys have a good chance of doing it."

Before beginning a raid, IBM signs a detailed contract with the customer to specify what should and should not be tested — a document Palmer affectionately calls the "Get Out of Jail Free card".

"When you go to the doctor you don't want to come away sicker. So our first rule is make sure we have permission, and the second is do no harm," he explained. "If we get into the system, depending on the agreement with the customer, we may create a file that says 'GSA Lab was here' or just read a specific file. We certainly don't damage

anything that we break into — most hackers don't either."

Palmer believes hackers usually consider themselves 'ethical' in that they are more interested in the intellectual challenge of cracking a security system than causing actual harm. However, he differentiates GSA Lab's work because it is done under contractual agreement. Palmer said many freelance security auditors (often reformed hackers or ex-employees) end up in hot water because they examine a network without any agreement with the company; sometimes these explorations are motivated by a benevolent desire to check whether security recommendations were implemented.

"Most hackers say that they are ethical because all they do is look and trade infor-



team are unofficially known as ethical hackers, and their job is to conduct detailed security audits on the computer systems of IBM clients, working with Big Blue's consulting arm and security emergency response bodies such as CERT.

What ethical hackers do

"Our mission is to understand network security as well as possible: what companies are doing at the moment; whether or not that's good enough; what they can do to improve it; [and] what bad people are trying to do within companies," Palmer told APC in an exclusive interview.

"Companies come to IBM consulting and want to know what would happen if [they] were really under attack," he said.

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mation — they don't do anything bad. I agree with that: the majority of hackers are just curious, they have a lot of time on their hands, apparently, and they don't do any harm. The problem is if you're a company that has computers on the Internet it's almost impossible to tell what kind of person they are.

"An ethical hacker is one that does this on behalf of the company and tells them everything that they do in a formal report delivered at the end of the job. An ethical hacker does not harm and hopefully does a lot of good. The other thing is someone knows you're doing it, you have permission. In that case, ethical equals legal.

"If we were testing denial of service attacks, the worst we would do is make the computer crash, and we would do it in such a way that they would not lose any information. We're very careful about doing that," he added. "However, some customers want as realistic as possible an attack, as though [it were] from some evil competitor or some horrible country. So then no holds are barred — if I can trash your machine and make it go down from across the ocean, that's what they want to know. If I can get into that machine and see sensitive information, they want to know. What can you see, what can you do?"

Mechanics of a hack

The starting point for an ethical hack is to explicitly define the terms of the raid. Some companies even request physical penetration to test whether the IBM hackers (as proxies for any outsiders) are able to gain physical access to facilities. As a result, Palmer's comrades, working with qualified break-in experts, occasionally undertake cloak-and-dagger missions, whether posing as Thinkpad-equipped builders, picking up misplaced security cards or engaging in 'social engineering' to enter computer glasshouses.

Then Palmer's colleagues talk with the customer about their security setup and requirements, before making an initial evaluation. Depending on the client's circumstances, the GSA team then tests a number of aspects. They use security tools to probe the network, coupled with hacker nous to force entry through common operating system and application holes that may not be patched. Creativity is essential: it's not unknown for Palmer and company to waltz through a company's internal connections after entering

via an offshore subsidiary that may not be as security-conscious as the parent. Nor is testing restricted to outside-in attacks: GSA Lab staff will, when requested, log in from the client's LAN to see how thoroughly internal network security is set up.

In a raid, two types of questions need to be answered. First, what data can be seen and/or modified by an outsider, a permissible guest user, or by a valid but unauthorised user? Second, does anybody notice? Intrusion detection is a particularly telling but often neglected aspect of security — without it, organisations have no idea if hackers attempt to break in.

The fourth element of ethical hacking is to write a report detailing the network as found, what holes were discovered, what impermissible activity could be conducted, and how to fix the problems identified. "The most important part of our job is to tell them how we did it and how to stop it," Palmer said.

GSA team members use numerous tools, both off-the-shelf products like IBM Network Security Auditor and customised aids. "Linux is the attack platform of choice because it's Unix-like, you've got all the source and you can do whatever you want. That's what bad guys use too," said Palmer. GSA Lab also uses the controversial SATAN package.

"SATAN is a good thing — if you use it," Palmer said. "We go to companies that say, 'Our policy says we run SATAN weekly and act on the response.' Usually that's the rule, and it's never even run. In some companies it's run regularly and reports are piling up on a desk somewhere and no-one is acting on them. Whether you run SATAN or NSA, that does not solve the problem. That just gives you the diagnosis. You have to act on it."

As its name suggests, GSA Lab also conducts research, tearing apart new and old software looking for security flaws. Palmer said the facility's relationship with CERT is "very close" and it shares discoveries with vendors so they can take corrective action. Part of GSA Labs is based in Switzerland and audits have been conducted around the globe, including one job in Australia.

Common security holes

Spending most of his time hacking, Palmer is uniquely qualified to identify common security lapses.

The number one source of vulnerability is Web servers. "Everyone wants to be on

the Web. They're in a hurry and they don't think about it or they don't have the expertise. Whenever we do a job and see a Web server, that's the first thing we go after." This applies irrespective of platform, since "they're all equally suspect", owing to unique bugs that affect each OS.

A second aperture results when enterprises fail to keep up to date with the latest bug patches provided by vendors — a problem that will increase as ambitious desktop OSes like Windows NT are put through the wringer. "As long as you have a connection to the Internet and as long as people write software, there will be bugs."

Connectivity provides the third source of frailty. Palmer said organisations are constantly surprised by the number of unknown connections that GSA staffers flush out, including important but undocumented links to international subsidiaries or branch offices. Particularly prevalent is the incidence of unknown modems that sit on workers' desks supporting dial-up Internet connections or telework arrangements.

Other security worries are equally basic: floppy disk drives provide a potential breach where viruses can be introduced and intellectual property copied. Similarly, although some WAN technologies remain unaffordable to hackers for now, Palmer emphasised that enterprises must be judicious when selecting ISPs because their weaknesses can become inherited holes.

So, is it possible to connect to the Internet with relative safety? "It depends on what they're worried about being safe from," Palmer said, emphasising that it's primarily a matter of understanding and managing the relative risks. What about, for example, running business-to-business extranet applications? "If you're doing electronic commerce, you have to be extremely careful — from your choice of ISP to locking doors. Connecting is fine. Sending your credit card over the Internet is fine — I do that. It's OK if you are aware of the risks."

"Once you can securely connect to the Internet and survive — and many companies are — then talking across the extranet shouldn't be an issue. The primary thing to remember, though, is that if you're partnering with a new company, you're only as secure as they are. You both may have secure connection to the Internet with great firewalls, [but] if the other guy has some back-door connections or other affiliates that you're not aware of, you're just as vulnerable as he is."

Appraising the hacker hazard

Internet lore aside, how menacing is the hacker threat? Palmer estimates that known expert hackers "at the top of the profession" number "maybe a dozen worldwide". They're "extremely dangerous" and they're after money, he added. IBM rarely works with reformed hackers. "I'm very wary about employing ex-hackers, just like the FBI is wary about employing ex-cons," Palmer said.

Less well known is the extent of corporate espionage — activities supported by unethical competitors and would-be blackmailers. Part of the problem stems from a reluctance to report such incidents, according to Palmer. However, attacks such as denial of service are not especially difficult and may become rewarding unless companies and government work together to combat such security breaches.

"Denial-of-service attacks are increasingly damaging because more and more companies are depending on their networks; they've got to get access to the Internet. If you can syn-flood them into oblivion they lose money right then. For those companies, online presence is important, and that's a very big issue," he said.

Downloaded viruses raise potentially greater concerns than floppy disks, but Palmer is circumspect about the relative dangers involved. "Follow the money," he counselled. "There's not much money in viruses, and there's not much money in denial of service unless you get into information warfare. The vast majority of hackers are only out for a lark. The threat of information loss is present — it depends on how valuable that information is. If you're a bank [or] insurance company, the threat is pretty strong. Luckily, the number of evil hackers is very small worldwide, but I'm afraid that is going to change because, as it becomes

got into a Unix system and the first thing they typed was a DOS command."

Shielding your networks

Palmer offers some basic advice to IT specialists worried about security. To begin with, "understand precisely" why you're getting connected to the Internet and what you expect to do. Security needs to be considered less as an impediment and more as a key enabling technology for the Internet. Palmer asserted that security may be encumbering but it's in everyone's best interests, just like car

Security needs to be considered less as an impediment and more as a key enabling technology for the Internet.

more and more obvious that ways to make money are there, it's going to get worse."

Inquisitive 'War Games'-style teenage hackers pose only an "insect-type annoyance", Palmer said. "The biggest worry about wannabes is that if they ever run across a powerful tool they probably won't understand it. I don't know how many systems I've seen where these new kids have

seatbelts. Once you're online, work out what needs protection, then consider how much you'll pay in terms of price plus usability.

"All we can do is raise the bar," he said. "Raising the bar means making it more expensive in money, making it more expensive in time. Hackers have more time than all of us put together."■

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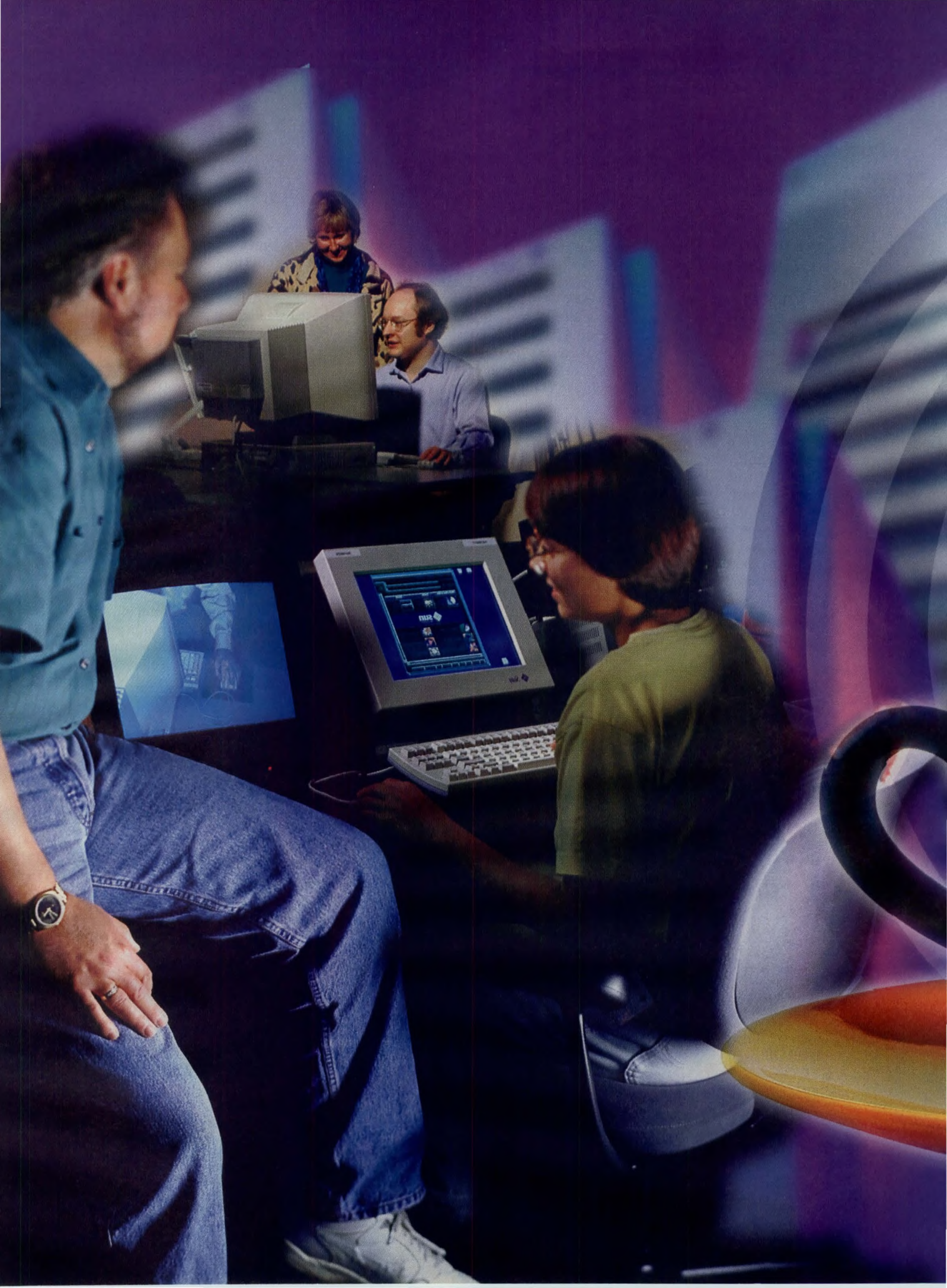
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Java is the industry's latest darling, promising a unifying revolution for software. How far has Java evolved — and how far must it still develop to become the platform of the future? By Dan Tebbutt

Java on the boil

A man with dark hair, smiling, is positioned inside a large, dark blue bowl. The bowl is set against a background of concentric, semi-transparent circles in shades of purple and blue, creating a ripple effect. The overall composition suggests the man is 'in the soup' or 'on the boil'.

Java is everywhere. You can't pick up a newspaper without reading hyperbolic Java declarations. You can't read a press statement from any vendor that fails to inject Java with formula-rised urgency. However, as we learned from past waves of hysteria about client/server and the Internet, reality often fails to match enthusiasm.

There's little doubt Java is a watershed, just as distributed computing and universal connectivity were. Yet broad rivers still must be crossed. Already we've witnessed a backlash against Sun's dubious attempts to manipulate an international standards body. Meanwhile, early application builders are finding write-once-run-anywhere (WORA) expectations bogged down in a quicksand of implementation problems. It's time for a reality check on the present state of Java.

A hot cup of Java

Java promises to provide a unifying software programming and execution layer that straddles all operating systems and microprocessors. This simple but incredibly bold objective could lead to unprecedented flexibility and reach for the software industry, reconnecting fragmented vertical markets into a massive pool of opportunity.

Java has already evolved considerably. It began life as a language for consumer electronics devices (see 'A short black of Java' on page 98) but shot to prominence as a tool for bringing static Web pages to life with animation and interactive functions. According to Scott Milener, CEO of Java developer Bulletproof, Sun's real coup came when Kim

Profile

Evangelising Java

Upstaging feisty Sun CEO Scott McNealy is a tall order. But at the JavaOne conference, one of his own employees actually wowed the crowd as much as McNealy did — during his own keynote.

Miko Matsumara, JavaSoft's charismatic evangelist, spellbound listeners by graphically demonstrating the destructive potential of ActiveX. He showed how



Internet Explorer, an ActiveX control written by a US researcher, could completely shut down a 32-bit Windows PC running Internet Explorer.

Naturally gifted for working an audience, the 28-year-old Matsumara nevertheless spends most of his time behind the scenes, nourishing Java as it grows into a rich computing platform. APC recently sat down with Matsumara to find out what a Java evangelist does.

"A Java evangelist is essentially on a quest for the killer app," Matsumara explained. "You look at the killer app as something that drives the platform and that gets in between what people need to do and what they can't do yet. It's about tickling people's imagination. I get involved in all sorts of innovation activities — interfacing with the venture capital community, with the education community, radical startups with vision.

"A lot of it has to do with demoing — you can't talk about what you've never seen before because there's no language for it," said Matsumara, who holds a Mas-

ters degree in Neuroscience from Yale University. "I demonstrate to them, they demonstrate to me, I take their stuff to demonstrate to others. Good code speaks for itself and the evangelist's role is to give the code a mouth."

Drawing together different threads of innovation in the Java start-up community is a key evangelical responsibility. Matsumara often facilitates direct contact between different companies who've shown him complementary technology under non-disclosure agreements. I'm acting as a spokesperson for the Java platform, so my agenda is not as complex as a venture capitalist who has their own portfolio to manage."

APC asked Matsumara to identify the best thing about Java. "One has to be careful about the question because it's too easy to pick your favourite feature," he replied. "It could be something like multiplatform which is a big issue for many people.

"But what really makes Java unique is on the social level, in that it's brought many disparate players together. The best thing about Java is its ability to unify people. Which is why you have disparate players from Oracle, IBM, Apple, Netscape coming together over the platform of Java simply because it's the right solution at the right time.

"That unification theme continues even in the sense of competition and how it brings health and vitality to Java: we don't have to necessarily compete *against* Windows head-to-head, simply because you can have Windows and Java."

He also believes Java's network intelligence is fundamental. "The design of Java was not just from a network orientation or for clients to use the network with Java: the designers of Java were so steeped in networking coming from Sun that they're almost synonymous.

So what will this killer Java application look like? "The killer app for Java has to be only doable in Java and push the boundaries back on our imagination," said Matsumara, who expects the idea will seed from an imaginative start-up. "The hallmark is going to be collaboration, because the interconnection of humans is going to represent the biggest supercomputation engine ever."

Dan Tebbutt

Polese convinced Netscape to support Java in its browser, providing "instant ubiquity".

Since then, expectations have changed as developers grasp Java's full potential. The language promised to catapult object-oriented development by eliminating C++ shortcomings such as fragile memory pointers, multiple inheritance and legacy C compatibility. Finally, through Java, the era of distributed, reusable object software could dawn.

Over its brief public lifetime, Java has been quite a social climber: no longer merely a programming language, it's become a platform. Consider it this way: for any microprocessor and OS, vendors need only port the Java virtual machine (JVM) and immediately they open up their device (PC, NC, telephone, gaming console, TV, VCR, car, whatever) to a rich array of software written in Java. Meanwhile, code-jockeys need only write to one platform (Java) to reach many user environments. As such, JVM has potential to become the most significant computational device in history, leaving closed vertical platforms like Windows, NetWare, Unix, Newton or Nintendo for dust.

Bringing Java to the boil

That's the future, but in the present Java faces some debilitating challenges. Foremost come serious doubts about performance and maintaining a single WORA standard. The core Java development kit (JDK) needs to grow quickly to deliver the range of functions expected in modern computing. In particular, JDK must expand its limited multimedia and user-interface feature set.

JavaSoft is on the case, but it has its work cut out. JDK 1.1, released in February, added Unicode-based internationalisation, the JavaBeans component model, enterprise features like Java Database Connectivity (JDBC), and remote method invocation and enhanced security, and began the process of enriching Abstract Window Toolkit (AWT). Sun's AWT was roundly lambasted for its limited user interface; for instance, only a handful of fonts were available.

Now AWT will be combined with Netscape's Internet Foundation Classes and technology from IBM's Taligent division to provide a "comprehensive set of GUI tools to build sophisticated applications", according to Eric Chu, JDK's marketing manager. Java Foundation Classes (JFC), the combined toolkit, will roll out progressively: features already available

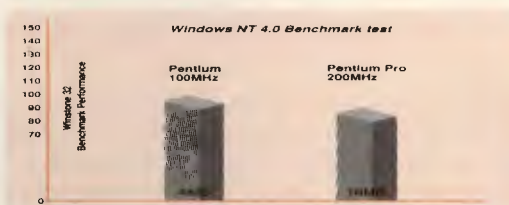
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include GUI aids (slide rules, toolbars, tabbed folders, and so on), text copy and paste and the delegation event model (separating GUI components from business logic components). Around September we should see better 2D graphics and cross-platform drag and drop.

JFC enhancements form the heart of the next JDK release, while the unofficially-named JDK 1.2 will also debut the new security model announced at JavaOne. This relaxes 'sandbox' restrictions so that Java applets gain restricted access to local resources like writing files to disk. Does this mean Java will become less secure, Sun's constant criticism of ActiveX?

"Security is an architectural issue," said Chu. "When Java was designed, it made a very clean separation between application and system resources." He said Java's inbuilt Security Manager polices resource access: the new model simply permits a greater degree of trust, backed by fine-grained control (for instance, allowing applets from a trusted source to open specific TCP/IP ports to perform particular tasks). Nevertheless, security always involves a trade-off between safety and function.

Longer term, JavaSoft will extend JDK to make "Java the best distributed comput-

tions as security, internationalisation, transaction processing, object modelling and performance.

Novell is another strategic contributor. It helped define Java Naming and Directory Interface (JNDI), an API allowing open access to compliant directory systems including NDS and LDAP. It's also pushing Server Java, a common set of extended Java APIs that will allow ISVs to program applications that could run on any server OS. Moab, the next release of IntraNetware, integrates Java at the kernel level. New CEO Eric Schmidt mandated that all the company's engineers learn Java and developer technology manager Steve Holbrook predicted Novell would eventually make all its services (including GroupWise and ManageWise) Java-accessible.

Currently this frenzy of goodwill is orchestrated by JavaSoft, but some fear its staff limits are creating a bottleneck. "JavaSoft is overrun," commented Holbrook, voicing widespread sentiment. The more political question is who controls Java standards. In March Sun responded to mounting pressure for an open process by applying to submit Java to the International Standards Organisation. However, even Sun's closest allies came out against

picoJava runs bytecode directly in hardware. SME announced several Java chips, including UltraJava (boosting speech, voice and video) and JavaBlaster (a Java-accelerating daughtercard), plus joint development efforts with Toshiba, Rockwell, NEC and Samsung. "Java is a renaissance for microprocessor architects" because JVM abstraction eliminates the drag of backwards-compatibility, said Marc Tremblay, UltraJava's chief architect.

The second improvement layer centres on JVMs, the platform-specific software that interprets Java bytecode. OS developers are only just beginning to understand how to implement the JVM. They've focused primarily on creating a working JVM, so it's natural to expect more efficient manifestations as JVM engineering improves.

Just-in-time (JIT) compilers (software that converts bytecode into efficient platform-native instructions on the fly) offer another source of improvement at the JVM layer. Matsumara revealed that Sun recently acquired technology called HotSpot that promises advanced JIT operations for every JVM. HotSpot provides dynamic compilation that keeps an eye open for execution bottlenecks and optimises around them. Importantly, HotSpot is not a JIT: it works within the JVM so every Java-enabled platform benefits. Chu expects HotSpot to be integrated into JDK "in the next nine months".

Matsumara's third leg-up comes at the system level. Java's garbage collection and threading will improve as the platform develops. "The HotSpot JVM collects garbage on the fly so you'll never have to stop to take out the trash," he quipped.

Fourthly, Matsumara believes improving the JDK core will yield a performance windfall, especially as HotSpot is welded into JDK. "HotSpot will run Java close to compiled native speed," Chu claimed, "so you can have the advantage of write once run anywhere without sacrificing performance."

The top acceleration layer will come as programmers gain Java experience, learning how to write more efficient code. Better tools should, theoretically, generate tighter code. However, several sources discounted the potential gains on this score. "Our engineers understand the assembly code effects," said Macromedia's Jim von Ehr.

One issue untouched by Matsumara is platform-native binaries. "Java is an interpretive language so there will always be a penalty," said Joe Herman, Java marketing manager for Microsoft's Internet division. He said JITs compile to native code on the fly, so creating native executables is "the next logical step". Development environments such as Asymetrix

Performance is demonstrably Java's Achilles heel. Put bluntly, Java software runs like a mangy three-legged dog.

ing platform", Chu said. On the cards are improved performance, richer JFC effects, addressing cross-platform consistency and further architectural extensions. The task of extending Java has provoked incredible cooperation industry-wide.

JavaSoft enjoys astounding access to the best technology and partners in the business. For example, erstwhile competitors IBM, Oracle and Tandem joined forces to develop JSQL, a common language extension that offers enterprises SQL developers a standard path to relational databases via JDBC. Down the line, Oracle will embed JVM abilities within its database engine, according to Internet marketing manager Steven Levine. He said this will make Java an ideal language for creating stored procedures, triggers and descriptions.

IBM is committing massive resources to Java development. Java will be "underpinning all our Internet efforts," said Allan Hess, IBM's Java business development manager. Big Blue was a crucial energy behind the JavaBeans component framework and Hess listed other contribu-

the proposal, which effectively makes JavaSoft its own standards body. At the time of writing, near-universal opposition looks likely to scuttle the ISO application, meaning Sun must find a more inclusive standards mechanism.

In the interim, Java functionality is building like a tidal wave.

The performance question

Performance is demonstrably Java's Achilles heel. Put bluntly, Java software runs like a mangy three-legged dog. Improving execution speed is a critical requirement before Java can become a contender. Java evangelist Miko Matsumara believes performance will improve at five levels and "acceleration on top of acceleration" will shift Java into hyperdrive.

At the baseline, Java chips offer a hardware boost, harnessing Moore's Law for Java's benefit. Sun Microelectronics (SME) has defined a core microprocessor specification known as picoJava that both SME and licensees can use to build Java chips.

SuperCede already offer native compiling (see APC April, page 44). In five or 10 years, most complex Java applications will be natively compiled, ventured von Ehr, while downloadable applets will remain in bytecode. Unexpected support comes from Novell: Holbrook said the company has definitely examined compiled code for core server applications. "If the solution is static after install time, why not?" he said. "You install from bytecode and optimise for the platform." Nevertheless, Novell is more interested in the mobility Java provides, enabling server applets to move freely between platforms.

Genuine performance gains are essential to Java's success. Novell wants to recast all its services in Java to extend their reach and mobility, but Holbrook realises slow-running applications "could be death". He's confident in JavaSoft's initiatives, and predicted HotSpot (which Novell was bidding to buy) "may make this discussion immaterial".

Unity and the Microsoft question

Ultimately, politics more than technology could determine whether Java fulfills its manifest destiny. If Sun felt breezes of opposition over the ISO stunt, it's staring down a runaway train when it comes to Microsoft. In March (page 129) APC closely evaluated Microsoft's Java machinations. Redmond's strategy boils down to three basics: provide the best tools and implementations so that Microsoft becomes the primary source for Java; harness Java's explosive growth by strapping it onto the Windows platform; and treat Java as just another programming language.

Present implementations and tools demonstrate the power of Microsoft's massive R&D budget and technical prowess: Microsoft's runtimes are about the best going and its development environments leverage an historic competency. In the nascent Application Foundation Classes (AFC), Microsoft hopes to entice ISVs to build on its foundation rather than JavaSoft's. A suite of JavaBeans building blocks, AFC is a critical wedge that could lure developers while AWT/JFC remains limited in functionality. As developers choose between AFC and AWT/JFC, the long-term fate and unity of Java will become apparent. Herman claimed Microsoft's recent acquisition of DimensionX, "which has the best multimedia technology for Java", gave Microsoft a "significant lead in the multimedia space" — as much as 18 months.

ISV mindshare will determine who leads Java. If Microsoft convinces a significant number to embrace AFC, it gains great leverage and Unix-like dialect splintering could befall Java. "Sun should be leading the charge, but Microsoft is doing more and it has the best implementation in terms of overall JVM performance and AFC," said Macromedia's von Ehr, whose experiences found AWT sorely wanting. IBM's Hess admitted that before JDK 1.1

"If they want to compete against Windows as an OS, Microsoft will vigorously compete. Java today cannot be compared to Windows."

cross-platform code was "hard to write", but argued AFC is Windows-dependent while JFC is platform-agnostic. Hess acknowledged fragmentation is "clearly a real threat", but added: "There's tremendous momentum from all but one company in the industry to develop this."

Useful cross-platform applications are still difficult with Java today, said Herman, pointing to restricted support for fonts, printing and peripherals. "There [are] always reasons to tailor software to individual platforms to take advantage of specific hardware and software," he said. "Java applications need to be competitive with applications written in other languages. To develop applications with the status of Java today, you really need native code."

For this reason, Microsoft is critical of Sun's 100% Pure Java branding program. Essentially Microsoft doesn't prioritise Java's WORA objectives as highly as the loyalist camp. It's happy to create the best implementation for Windows (and arguably Mac OS) so that Wintel users benefit from Java, but it knows no imperative to assist Java as a platform. "If they want to compete against Windows as an OS, Microsoft will vigorously compete," said Herman. "Java today cannot be compared to Windows."

Scalded by Java

Many Microsoft reservations are borne out in Macromedia's experience during a 1996 project called JumpJet. For the dominant multimedia authoring vendor on both Mac OS and Windows, project leader von Ehr expected JumpJet to be Macromedia's leap forward — a Java multimedia authoring environment written wholly in Java.

"We had intense plans but spent way too much time programming around

Java's problems and Mac or Windows implementation problems," he told APC. Eventually, Macromedia was forced to abandon the project.

"Java the programming language was good, solid and a pleasure to work with — but AWT was not well designed and not well implemented," said von Ehr, identifying Macromedia's nemesis. Each JVM has unique shortcomings, inducing death by a thousand cuts. Performance is highly

problematic (although von Ehr praises endeavours by Microsoft and Metrowerks), but ultimately AWT was inadequate for Macromedia's needs. "We can't tell our customers to live with these problems. Our customers are highly aesthetic."

Microsoft's JVMs and AWT are much better in von Ehr's opinion — but only "if you're willing to program to a Microsoft dialect". That's simply not an option for Macromedia, whose customer base is evenly divided between Mac OS and Windows. "Both Microsoft and Apple are embracing Java, but they want to carry it in different directions," he said. "It's hard with Microsoft tearing away at the standard. It's too early to say if Java is going to be cross-platform. But if we need to code to individual platforms, Java will be easier because it's object-oriented."

Despite JumpJet's misfire, von Ehr retains faith in Java. "I'm not dumping on Java — it's a great language and most programmers will use it in five years," he said.

"For large applications, if you're starting now Java is clearly the right choice."

Changing expectations

Corel Office for Java (COJ) is the most celebrated Java development project. Corel learned a lot and applied those lessons to reshape the mission.

In the beginning, COJ was promoted as a suite of full-scale Java applications, but the end product will actually be a component suite consisting of JavaBeans. "We significantly changed our strategy," said Corel's director of Java engineering, Vincent Lin. "Office for Java will be small suites. For serious applications like WordPerfect, it's still too early."

Although not ready for prime time, Lin

A short black of Java

Legend has it that James Gosling conceived Java after realising the card-operated door to his hotel room contained a CPU. Imagining how to harness millions of isolated consumer microprocessors, Gosling quickly realised the obstacle was the absence of a common language across incompatible chips and operating systems.

To this day, it pays to remember Java's original intent. In all the excitement, many people forget that Java works not only for PCs and NCs but is uniquely suited to diminutive, high-utility consumer devices like pagers, mobile phones, PDAs, even smart cards.

At JavaOne, JavaSoft amplified Java's appeal as a common platform for programming pragmatic contraptions. It announced two new initiatives that array Java into four 'phases' or levels. At the lowest level is JavaCard, a limited implementation of EmbeddedJava, itself a subset of PersonalJava which in turn derives from the full Java Development Kit specification. On top sit extended Java APIs that supplement base JDK functionality.

Maintaining useful compatibility across devices ranging from smart cards to mainframes will be tricky. The relationship between the four phases is supposed to be one of "upwards-compatibility", according to Curtis Sasaki, Java platform manager at JavaSoft. This means applets created for a lower phase should run on more endowed machinery, but the inverse will only be true where local capabilities enable sensible execution. Exception handling should weed out unwanted actions, but Sasaki pointed out that networked devices can download class libraries on the fly, where appropriate.

Announced in 1996, JavaCard has been licensed by major smart card manufacturers seeking opportunities for standardised commerce, network access and intelligent functionality.

EmbeddedJava is designed to run on limited-purpose devices, especially products with minimal display capabilities like faxes, pagers and factory equipment. Such devices generally have limited

memory resources and often power constraints, so EmbeddedJava strips away redundant features.

PersonalJava spans the capability gap between simple devices and computers. Specifically, it aims to enhance network-connectable products with reasonable display capabilities; classic cases include set-top boxes, PDAs, gaming consoles, enhanced mobile phones and TV-based Internet solutions. Already PersonalJava is fostering novel applications such as viewing cat-scan images via intranet browsers.

Firm specifications for EmbeddedJava and PersonalJava should be finalised by year's end, but Sasaki said JavaSoft is already working closely with consumer electronics, telephony and gaming companies. Although he declined to discuss details, Sasaki expects products to be available by Christmas.

These announcements were welcome news for PDA developers struggling to implement Java virtual machine technology within tight memory constraints. Unofficial reports suggest Apple's Newton subsidiary might have a JVM late this year, while Microsoft sources would only say that Windows CE should have a Java runtime environment by late 1997 or early next year. US Robotics has not announced a JVM for its Pilot palmtop, however software called Jump can cross-compile Java classes into native Pilot applications.

Network infrastructure is one arena where Java should prove compelling. At this stage connectivity companies are primarily examining Java to rearchitect management software towards browsers. More captivating is the notion of embedding Java functionality within network hardware like routers and switches. Today some hardware can serve Java applets via HTTP, but devices with native JVM capabilities introduce more intriguing potentialities. For example, 3Com's Doug Hyde said embedded Java could enable policy-based network administration or automatic virtual LAN reconfiguration.

Dan Tebbutt

maintains Java is a good enterprise platform "because it crosses all legacy systems, both clients and servers". Lin said Corel has proved WORA by making operational COJ betas available on over a dozen platforms. JavaBeans also makes Java much more modular than ActiveX or Unix components.

Lin identified Java's weaknesses as: printing; fonts ("we need more than five fonts as a word processing company"); multimedia; speed; and stability ("at this moment the platform is not strong enough to do serious, huge apps").

Successful Java development is a question of approach. In switching to the JavaBeans model, Lin said Corel could take Java's strengths while avoiding weaknesses. Applications like the Quattro Pro for Java spreadsheet will consist of hundreds of individual Beans providing UI features, views, charting, function engines and mathematical abilities.

JavaBeans introduced a whole new model, according to Lin. Now clients can tear off certain application features and substitute their own, such as customised user perspectives. As a result, Lin predicted

Corel software could step beyond retail channels and offer more flexible sales models for enterprise suite markets. Stability and performance will take a while to meet Corel's expectations, but in the meantime the company has gathered valuable experience and planted the seeds of component-based software.

Corel's lessons were not lost on rival Lotus Development. Besides adding Java functionality into its Notes groupware at an impressive pace, Lotus has adopted the component approach for desktop applications. Kona is a suite of JavaBeans and a lightweight shell targeted at network-centric corporate environments, particularly NCs (see APC June, page 38). Along the way, Lotus authored InfoBus, a technology that enables applets to communicate and share data, and licensed it to JavaSoft.

The state of Java

Taking a snapshot of Java today, it's apparent that Java the language needs to be distinguished from Java the platform.

As a language, Java already represents

a magnificent achievement. Successful evolution of C++ makes Java the language most likely to popularise OO programming and component software. Java's OO development can as much as double programmer productivity, according to Corel's Lin, who added that eliminating pointers further elevated Java.

On the platform side, the outlook is cloudier. ISVs are aggressively embracing Java in pilot and early adopter levels. Still, JavaSoft and JVM partners need to address performance and reliability as top priorities. JavaSoft's industry-spanning 'cooperation' will go a long way towards ensuring Java has all the whistles and bells it needs, but many ISVs will hold their breath until it's clear whether Microsoft will decaffeinate Java unity. Some won't rest easy until a consensual standards body has purview over the platform.

No-one doubts the stakes are high. Java is the industry's "last and best hope for a cross-platform solution", Lotus president Jeff Papows declared at the recent Comdex. "If we screw this up, we all are going to be enormous losers."■

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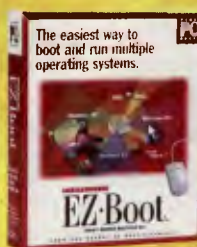
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If 1996 was the year Java arrived in style, 1997 is the year for it to get down to substantial work.

Putting Java to work

In its two-year lifespan, the scope of Sun's programming language has evolved from dressing up Web pages to being the next great platform for Internet computing. Accordingly, the tools have come a long way, evolving from simple combinations of run-time libraries, debugger and compiler to the fully integrated development environments (IDE) expected by mature developers.

But if you're waiting for the dust to settle and the best tool to emerge, you may have to keep on waiting. While there are several good offerings on the market, no one tool has really stood out. It remains to be seen if the current breed of Java tools has what it takes to win over a critical mass of developers, including many yet to be convinced by Java's story.

The first tool for developing Java was Sun's Java Development Kit (JDK) 1.0 — a basic but popular free tool consisting of a compiler, interpreter, class libraries, applet viewer and debugger. A rash of slightly more sophisticated products were soon offered by start-up companies. Such tools are considered 'first generation' compared to the more sophisticated tools now on offer.

Second-generation tools

Most so-called 'second generation' tools come from established C++ vendors, including Microsoft, Symantec and Borland. The main similarity is a visual programming interface, as second-generation tools move towards visual rapid application development (RAD) programming environments, similar to tools such as Visual Basic and Delphi. Such tools make a series of assumptions based on the developer's point-and-click selections to generate Java code that can then be modified. These options can be turned off for seasoned C++ developers, but for novices, they are a great on-ramp to Java.

Other common features in second-generation tools are two-way development, support for JavaBeans components, database integration via Java Database Connectivity (JDBC) and a just-in-time compiler (JIT) to increase execution speed.

Among the first Java tools to be released was Symantec's Cafe, providing

an IDE including wizards for starting projects and generating default applets, a graphical source-level debugger, a native Java compiler and Cafe Studio for creating Java views and forms. Cafe was strictly for experienced C++ developers, but earlier this year Symantec released the more intuitive Visual Cafe, blending point-and-click programming and wizards. Diehard programmers can still work at the code level, but most will want to use Visual Cafe's Interaction Wizards that help programmers generate basic events by dragging one object onto another then generating a series of natural-language statements to suggest events. It also ships with over 100 components (that will become JavaBeans in the next release) and Symantec's JIT, which was licensed by Netscape for Navigator 3.0.

Microsoft's Visual J++ 1.1 builds on the strengths of Visual C++ but, like its predecessor, it's not particularly visual, with emphasis on raw source-code files rather than Visual Cafe's focus on browsing and editing classes. Support for ActiveX objects is a strong point, enabling Visual J++ developers to write ActiveX components in Java and import ActiveX controls just like any other Java class. An ActiveX component also provides out-of-the-box database connectivity. On the downside, Java Beans are not yet supported. Visual J++ also has good debugging capabilities, making use of the Internet Explorer 3.0 debugging API instead of a lightweight applet viewer.

SuperCede, a combined Java/C++ environment, is Asymetrix's first foray into this arena. Like most Java environments, it lets developers design visually by dragging components onto a form and then creating Java source code based on the form design. SuperCede breaks new ground with its interactive programming enabling developers to modify a program while it is running, greatly speeding up development time. Asymetrix also has a SuperCede Java/ActiveX edition with automatic Visual Basic to Java conver-

sion, using technology licensed from TVObjects.

Another vendor that began to go down the combined Java/C++ route before changing direction is Sybase's Powersoft division. Formerly part of Powersoft's

Optima++ (renamed Power++) toolset, PowerJ (in beta as APC went to press) shares many

enterprise-oriented Powersoft features, in addition to using the same Watcom compiler technology. Rather than straight applet development, PowerJ addresses the problems of building and deploying business applications. It offers project management features

with an object repository, includes the SQL Anywhere database and support for server-side Java and JDBC. PowerJ will also allow developers to import and use ActiveX components. It offers a choice of debugging environments — either a browser or an applet viewer.

IBM's VisualAge is another tool suited to experienced C++ developers, according to David Looke, managing director of Java tools reseller Microway. VisualAge offers a collection of tools for automating connections to remote data, middleware technology to handling communication and drivers to enable Java access to virtually any database. As with SuperCede, updating code in a live environment is also supported. VisualAge has strong database integration via the Data Access Builder, which can read a database schema remotely then create a corresponding JavaBean, giving the application access to that data. This data-aware component can then be dragged onto a form. Visual Builder lets developers create applications graphically by creating connections between JavaBeans. Once basic connections are plotted, the JavaBean's methods can be used to interact with the host database. In addition, VisualAge is the only tool currently enabling integration of JavaBeans and CORBA components.

Borland's JBuilder (in beta at press time) also provides CORBA support via Visigenic's VisiBroker for Java Object



Java applications

An Australian perspective

While Australian software developers have been quick to sense the potential of Java, both as a distribution medium and as a means of more readily developing cross-platform applications, few have reached the pinnacle of actually releasing a commercial product.

Perhaps the most prominent exception is Sausage Software, the company that made its name with the HotDog HTML editor and has since achieved a dubious kind of media fame as the company which floated on the Australian Stock Exchange for \$50 million last year, before dismissing a barrage of staff earlier this year and re-focusing on electronic commerce.

While reams of paper have been devoted to assessing Sausage's long-term chances of survival and profitability, it has cleared a major hurdle by actually releasing commercial Java products. It first dabbled with Java applications with its Snaglets, miniature Java components designed for easy customisation and deployment on Web sites and intranets. Popular Snaglets have included Egor (which handles basic animation), Jack-Hammer (which simplifies accessing busy FTP sites by continuously attempting background logons while you work), and FrameGang (which eases development of Web pages using frames). Snaglets are typically priced between \$US25 and \$US100.

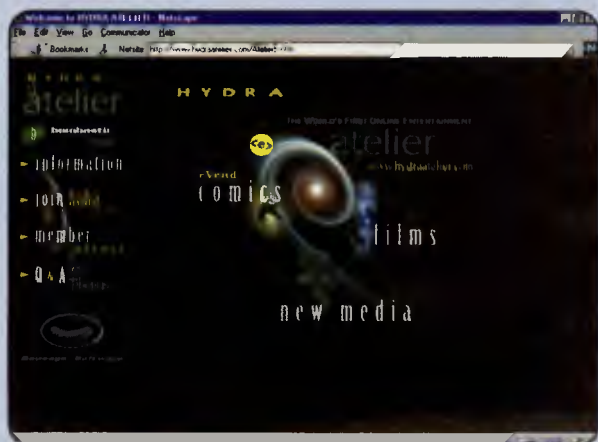
Sausage's current focus, though, is on eVend, a complete electronic commerce system built in Java, first announced in March and released in May. The eVend system comprises a front-end page build-

ing tool (EVE), a series of 'Cashlets' that allow charging for Web content (including software) and a back-end database to store details of the transactions. Sausage charges an up-front fee for the software, and also asks for a percentage of every transaction made through the system. Java was an essential prerequisite for such a project, according to Sausage officials, since it allowed the widest possible range of clients to access eVend-enabled pages.

At the centre of the eVend strategy is a somewhat contentious idea: people will pay for decent Web content. "Pay-per-view content is the fourth business model for the Web, and we believe it will be the most effective," Sausage CEO Steve Outtrim proclaimed at eVend's launch. Only time will tell if this strategy makes Sausage profitable once more.

Few other developers are dabbling as extensively with mass-market Java application production; while Java development skills have rapidly become important in the Australian developer community, most current deployments are project-specific and relate to particular sites or custom vertical applications, rather than products aimed at the commercial market. Companies that have worked in this area include Noware (whose director, Adrian Vanzyl, has also worked with Sausage), which offers a 'no-brainer' Java development tool for non-programming users; Melbourne developer Solid Software and Brisbane firm Plugged In Software.

Angus Kidman



Content provider Hydra Atelier utilises Sausage's eVend system.

Request Broker (ORB). This enables JBuilder developers to use Internet Inter-ORB Protocol (IIOP) to link distributed application objects on local servers or across the Internet. JBuilder is another tool focusing on database access. Its DataBroker supports any JDBC or ODBC-compliant data source and includes native drivers for Oracle, Sybase, Informix, DB2 and Microsoft SQL Server, plus Borland's JIT.

The work ahead

For a technology whose main benefit is cross-platform portability, Java development tools are fairly Windows-specific. All the tools mentioned above run on 32-bit Windows with JavaSoft's JDK 1.1 also running on Solaris and Mac OS. Symantec's products run on Mac OS, while VisualAge has upcoming OS/2 and AIX support.

As far as the technology has come, developers are still likely to hit several brick walls. For those used to coding in C++, slow compiler speed will be a problem, according to Microway's Looke. "That's really what's holding it up," he said. "It's too slow." However, Looke added that compiler speed was a problem common to all new languages and the situation should improve later this year.

Slow download speeds were a Java negative for the Commonwealth Bank when developing the NetBank online banking service, according to Greg Phipps, technical director at Lintas Online, which developed the site. Java did not have any extra functionality to compensate, he said. "Realistically, in terms of what we're doing, Java wouldn't add much. Because Java runs in a sandbox on the client machine, what you can use it for is quite limited," said Phipps. Instead, Lintas Online is using Microsoft's Active Server technology to develop a system where all the processing takes place at the server.

Java certainly isn't standing still, and the coming year will see enhancements to all the tools mentioned. Advances are likely to include greater interoperability with CORBA. IBM, Netscape, Oracle and Sun together recently proposed CORBA enhancements allowing future development tools to automatically generate JavaBeans interfaces for CORBA-compliant components. In addition, Java developers can look forward to faster compiler speeds, ActiveX/Java bridging and additional JavaBeans components. So stay tuned.

Dominique Jackson

How well does your platform of choice support Java?

Pour yourself a strong cup

Microsoft Windows

Way back in 1995 when Java first entered the consciousness of Web surfers, opposition from Microsoft was strident. Corporate evangelists decried Java's flaws, and trumpeted ActiveX as the way to provide distributed, component-based computing over the Internet. However, OS-bound ActiveX technology failed to make quite the impact Microsoft had hoped for, and Java remains champion of the Web.

Since Internet Explorer 3.0, Microsoft operating systems have supported Java — and now the Seattle giant is attempting to control Java's progress.

Current and future Microsoft operating systems support Java through Web browsers, but integrating IE 4.0 into the OS will soon make Java applets an essential system feature. IE 4.0 will hook into the core of Memphis and NT 5.0, while introduction of JavaScript together with VBScript should engineer a return of the batch file. IE 4.0 supports embedded objects and has a built-in JVM, so users can launch Java directly from their desktop and directory views. Microsoft plans to splice IE 4.0 into all incarnations of Windows — even Windows CE is on the Java roadmap, with the unannounced PocketJava expected to enable CE devices to run Java applets.

Still unclear is just how complete Microsoft's implementations will be. Although Sun insists Microsoft's licensing agreement requires full JDK implementation, Microsoft Java marketing manager Joe Herman said the company has "no requirement to support any specific JDK in its products". It has vouched support for JDK 1.1 changes, but only time will tell whether full JDK compatibility continues.

Java's influence on Windows in its various forms extends deeper than just JVM implementations. Microsoft now regards Java as an alternative tool for developing component-based applications for the Windows platform. ActiveX is being positioned less directly against Java, as Microsoft promotes ActiveX for integrating components produced by various languages.

Derived from Microsoft's Component Object Model (COM), which defines how components are delivered and communicate, ActiveX enables transportation and

reuse of components, whether they are written in C++, Visual Basic, Delphi or Java. For instance, ActiveX lets developers produce an application in C++ that opens an ActiveX control written in Visual Basic which in turn is controlled by a control written in Java.



In its latest developer tools, Microsoft makes it easy to invoke Java from ActiveX controls and to access ActiveX controls from Java. Microsoft is tackling the issue of limitations inserting Java components in non-Java containers and vice versa. Herman said IE 4.0 will support dynamic two-way interoperability between ActiveX and JavaBeans. For ActiveX developers, Java is 'just another programming language'.

Another important facet of Microsoft's Java strategy revolves around foundation class libraries. Announced in January, Microsoft Application Foundation Classes (AFC) directly competes with JavaSoft's often-criticized building-block products (see main feature). AFC support first appeared in IE 4.0, and once it is fully integrated into all versions of Windows,

Microsoft will do its utmost to convince developers to use AFC instead of JavaSoft's foundations.

Some fear that if Microsoft takes hold of the reins, we may see Java become Windows-centric, rather than a cross-platform language. Microsoft representatives publicly desire to see Java applications, especially performance-critical applications, written and compiled to take advantage of Windows APIs — a compromise JavaSoft and its allies are attempting to repudiate through the 100% Pure Java certification program.

Another facet of Microsoft's strategy could see Java used in future iterations of Distributed Component Object Model (DCOM), a technology that allows objects to communicate over a network. DCOM, introduced in NT 4.0, is reportedly being ported to Java to extend multiplatform reach.

Also noteworthy is the appearance of Java-based application services for Windows NT. While Microsoft itself has not said it will provide application services to Java-based clients such as NCs, several partners including Insignia and Citrix are already selling NT-based application servers for NCs. Insignia's solution is entirely Java-based.

At a recent developer conference, Bill Gates outlined his ambition to provide the best Java performance available along with the easiest development environments. He promised advanced support for component software distribution and interoperability. The open question is, if Microsoft delivers, what happens to Java?

Nathan Taylor

Apple Mac OS

Apple was painfully slow to get its Java act together, but lately it's been making amends. Mac OS Runtime for Java (MRJ) debuted in January, and while it's no speed demon, it's a commendably stable implementation of JDK 1.02 for PowerPC and 68030/68040 Macs.

Mac OS 8 made MRJ standard system software. However, Apple's Allan Bell warned that MRJ 1.02 is more focused on compatibility than performance. Bell said Version 1.5 with its just-in-time compiler

(JIT) will bring much faster performance, a claim borne out in unofficial tests by online zine Webintosh. MRJ 1.5 went beta in June, while MRJ 2.0 with JDK 1.1 support is already in alpha testing and slated for release this year.

Apple is pursuing closer ties with Cupertino neighbour JavaSoft to ensure more timely access to development work in progress. The partners claim this means Mac OS support for JDK 1.2 should arrive simultaneously with Windows and Solaris in late 1997.

Apple also released an SDK for creating standalone Java applications that can be launched straight from the Mac desktop. Its JManager API allows any Mac application to call up MRJ.

Happily for Macophiles, Apple faces competitive pressure to hasten MRJ development. Apple originally licensed Natural Intelligence's Roaster, the first JVM for Mac OS, before deciding to build its own implementation. Roaster is still developing quickly — the forthcoming Version 4.0 adds JDK 1.1 support, while Webintosh found Roaster 3.0 to be the fastest Mac JIT. However, applets must run within the standalone Roaster Runner application.

Netscape's Navigator 3.01 is probably the most widely used JVM, but its Mac performance is abject. Communicator 4.0 should be a different story with the inclusion of Symantec's JIT — Webintosh found fivefold improvement, but Communicator still significantly trailed MRJ and Internet Explorer JITs.

While Netscape is dogmatic about its JVM, Microsoft's IE 3.01 gained considerable kudos by letting users select their JVM. IE can use MRJ or either of its own run-time alternatives — a standard JVM or a JIT co-developed by Microsoft and Metrowerks. With JDK 1.1 support expected, it's ironic that the best Java solutions for Mac OS come from arch rival Microsoft.

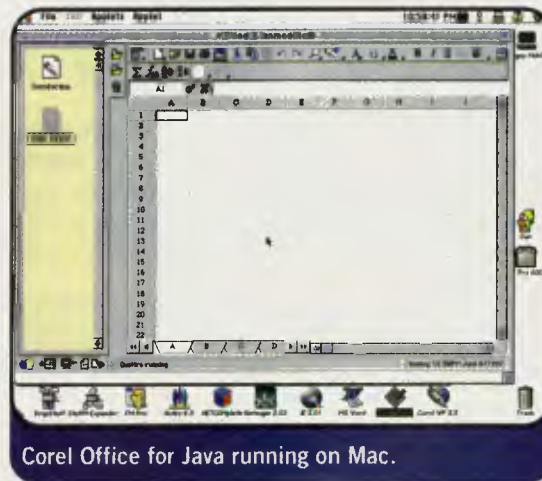
When Rhapsody appears, Apple faces the difficult task of juggling two implementations. The Blue Box compatibility environment will rely on MRJ, but Bell said native Yellow Box applications will enjoy a climate that combines the strengths of Java and Rhapsody to run high-performance applications at near-native speed.

Helen Dancer and Dan Tebbutt

IBM OS/2

OS/2 Warp is a prime beneficiary of IBM's push to develop and embrace Java as a new platform-independent standard. IBM has invested more money into Java than Sun itself in attempts to kick-start devel-

opment across a wide variety of applications. If successful, OS/2 will benefit through its internal Java support: rich Java applications could eliminate OS/2's prior history of poor ISV support, making it a viable alternative in future.



Corel Office for Java running on Mac.

Currently OS/2 Warp 4 is the only OS with Java built into its core, allowing users to run Java applications directly on the desktop. Originally released as a JDK 1.01 runtime, OS/2 now supports JDK 1.02 through a freely downloadable update (see <http://www.software.ibm.com/os/warp/java/java102.htm>). The 1.02 update reportedly runs 60% faster than the original implementation while extending Java support to the whole OS/2 Warp family, including Server, Connect, SMP and the Warp 3 client.

This upgrade was the first of many in an initiative called Software Choice which is designed to help OS/2 users incrementally update their OS online as fixes and upgrades become available. Updates are installed through a browser such as Netscape 2.02 for OS/2 as part of IBM's commitment to keep OS/2 charged with hot technologies like Java.

While the current JDK for OS/2 is 1.02-based, IBM spokesperson Allan Hess said IBM is working "frantically" to bring its platforms up to JDK 1.1, and OS/2 should soon follow AIX to the next level. An alpha of JDK 1.1 for OS/2 was released in April with a final version scheduled to appear by the end of the year. A full 1.1 runtime environment including international language support is scheduled to appear around the same time for all OS/2 Warp platforms.

As its Bluebird initiative showed (see APC July, page 24), IBM views Java as the catalyst to transform future versions of OS/2 into a network-centric operating sys-

tem integrated into IBM's Network Computing Framework.

In addition, IBM has promised strong Java tools on OS/2, with VisualAge for Java slated for release concurrently on OS/2 and Windows NT later this year. Big

Blue is also providing OS/2 boxes to KeyLabs, the body contracted by JavaSoft to certify 100% Pure Java applications, to ensure Java applications are tested on OS/2. Furthermore, IBM will help developers make sure their products operate smoothly under OS/2.

Ashton Mills

Java for Unix

All the major players in the Unix arena offer support for a version of the Java Development Kit. While most support the latest release (1.1.2), some are still in the final stages of implementation. Interestingly, none stands out in the crowd

as a significant leader in the field of Java development.

As expected, SunSoft's Solaris supports the latest JDK as soon as it is released, and JDK 1.1.2 is already supported. It expects to support Version 1.2 as soon as it becomes ready, anticipated to be later this year.

Silicon Graphics supplies the Cosmo suite of Web products with all current versions of Irix, which includes support for JDK 1.1.2. SGI's visual development software will also be available for Windows 95 and NT in the second half of this year, according to company representatives.

IBM is also up to JDK Version 1.1.2 on its AIX operating system. While still only supporting JDK 1.02 for OS/400 and mainframe (OS/390) host systems, it promises upgrades in the coming months.

By August, both versions of SCO's Unix platforms, OpenServer and Unixware, will include support for JDK 1.1. While SCO will continue to support these existing platforms, they are due to be replaced in the third quarter with a merged OS, codenamed Gemini. This too will support JDK 1.1, and as soon as JDK 1.2 is certified, it will be supported.

Hewlett-Packard has a pre-release version of the HP/UX implementation of JDK 1.1.2 available for download from its Web servers. A final version will be available by the end of next month, said an HP spokesperson.

Finally, JDK 1.1.1 with POSIX threads and the Digital just-in-time compiler is available for Digital Unix (formerly known as OSF/1).

Selina Mitchell

Riding the Communications Wave

At Internet World Australia Pacific 97, visitors can sit in on discussions about the latest techniques and trends, and then see the tools and technology in action on the exhibition floor.

While the Internet has been growing at a phenomenal rate, the business community is only now becoming aware of the full advantages of Web-related business practices and the advances being made in the technologies used by the Internet and intranets. Management concerns have progressed from what is the Internet, to how can I use it, and on to the latest inquiry: how can I make the best use of the Internet?

Internet World Australia Pacific 97 — to be held at the Sydney Convention and Exhibition Centre, Darling Harbour, from August 11 to 14, 1997 — has reflected these changes in the market and provided a conference programme and exhibition to meet the new demands.

The four-day event is not only the largest of its type to focus specifically on the Internet and its related technologies, but it's the third local Internet World and was the first event to specialise in the evolving technologies of Internet, intranet and World Wide Web applications.

According to the event's local organiser, Kirby Network Services, Internet World Australia Pacific 97 is designed to provide business solutions for delegates — specifically the tools and knowledge for creating and deploying Internet strategies effectively in today's new competitive business environment.

Peter Reid, Marketing Director at Kirby Network Services, said that because Internet World Australia Pacific 97 is also an extension of the highly-successful US-based Internet World, his company has access to high level international and local speakers who have been selected to exchange their knowledge, vision and experiences with delegates.

The Internet World exhibition runs over three days, from August 12 to 14, and is preceded by pre-conference tutorials and workshops, on August 11 and 12.

The actual body of the conference takes place on August 13 and 14 and is divided into two tracks, offering 50-minute sessions that focus on the business utilisation of the Internet and World Wide Web Issues.

Topping the list of pre-conference events are the Advertising Forum, sponsored by www.consult, while US telephony specialist pulver.com presenting the

Internet Telephony two-day workshop. The conference also includes many other educational, technical and design sessions and tutorials, as well as specialised Hands-On Workshops limited to 30 people each.

The half-day Internet World Advertising Forum takes place on Monday, August 11. It is geared for marketing and advertising people interested in learning how to make the most of Internet advertising.

The Advertising Forum is sponsored and organised by www.consult, one of the leading local Internet research and marketing consultancy firms. The agenda of the Forum is to discuss the growth of the Australian market, look at some of the key players, examine publishers, search engines, ad networks and, through case studies, overview what works and what doesn't.

Speakers include Tony Faure, Group Publisher, APN&ZD Net Australia; Michael Reis, head of marketing and business development at AAA Matilda Search Engine; Zeb Rice, GM of News Interactive; Nigel Dews, New Business Development Manager, Fairfax; and Anthony Bertini, MD of Softbank Interactive Marketing Australia/SE Asia. B&T Editor, Tony Burrett, is also speaking, as is Ed Charles, Editor of Ad News.

Heading up the two-day Internet



Serious Business

The organisers of Internet World Australia Pacific 97 are expecting more than 700 delegates to attend the conference, compared to 580 last year, and an attendance level at the exhibition of between 10,000 and 12,000 business professionals.

Why? According to Reid, when Kirby Network Services ran the first Internet World in Australia, in 1995, the Internet was a new concept and the business advantages of the medium were only just beginning to be understood. But over the last three years, an important education process has taken place. Now, large corporations, small companies and individuals are developing, producing and servicing this rapidly growing marketplace.

"The Internet is no longer a novelty whose longevity is in question," said Reid. "Our target audience this year has a far greater understanding of the technology. They are looking for the most effective products and services to suit their needs and the best ways in which to use these products."

Telephony Workshop at Internet World Australia Pacific 97 is Jeff Pulver, president of Internet consultancy firm pulver.com in the US, chairman of the Voice on the Net (VON) Coalition and a leading Internet analyst. This workshop begins on Monday, August 11.

Pulver is flying to Australia to review current and future Internet Telephony technology at the Telephony Workshop. He will also examine its effects on business through CITI (Computer Internet Telephony Industry) and look at voice applications such as Internet Call Centres and wireless VON.

Other speakers at the two-day tutorial include Dialogic's Bob Heymon, Critz Chan of Natural Microsystems, VocalTec's Chad Finkelstein, Microsoft's Blake Irving, Kathy Meier of Lucent Technologies, and IBM's Mike Jabalon.

Four keynote speakers will be opening the main conference on August 13,

**Internet
World 97**
australia
pacific



Internet World is backed by Mecklermedia Corporation in the US, whose founder, Alan Meckler, has seen the US Internet World show grow from a small hotel conference room to 600,000 square feet of the LA Convention Center in less than four years.

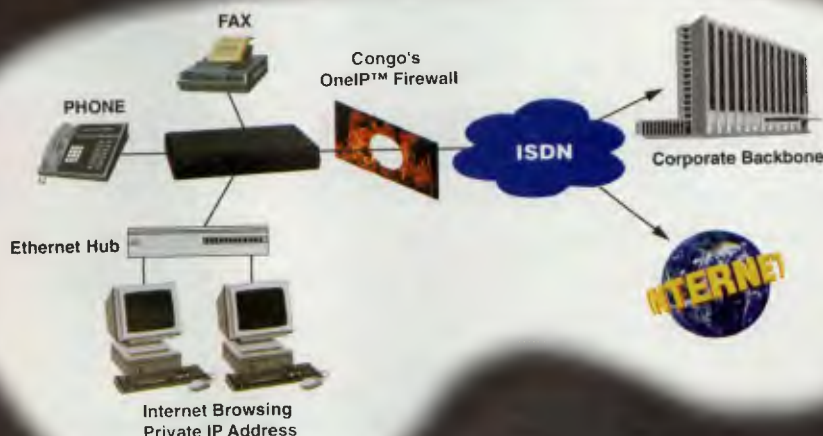
Meckler — who believes that companies involved with developing products or technologies for the Internet just can't afford not to be there — said the reason Internet World works is because of its sole focus on the Internet.

"We do not drift to other computer issues," said Meckler. "The show is simply about the Internet. It is a business-to-business trade show."

Like the US show, the Australian Internet World conference and exhibi-

tion offers a global view, but is also specifically geared to meet the needs of a local audience. To shape the local conference programme, Reid said a previous delegate survey was put into action, which highlighted a strong interest in seminars on Web site content.

"People want to know what actually works," said Reid. "They are also particularly interested in how the Internet can be used in business strategies," he said.



presenting their views on the Internet and its implications for businesses. These include Senator Richard Alston, the Minister for Communications, who has a long history of involvement with media issues in Australia. Senator Alston has been Minister for Communications and the Arts since March 1996 and is also a member of the Prime Minister's Science and Engineering Council.

Malcolm Turnbull, MD of investment bank Turnbull & Partners, is also addressing delegates. Turnbull & Partners has played an important role in promoting the development of Australian technology and was responsible for the successful float of OzEmail Ltd, Australia's leading Internet service provider and the first Australian company to complete an initial public offering on the NASDAQ Stock Market in the United States.

Another speaker is JoAnn Patrick-Ezzell, who's in charge of AT&T's Internet, Electronic Commerce, and other advanced online and transactional services throughout the Asia/Pacific region. Patrick-Ezzell

has overseen the development of region-wide multimedia and integrated solution strategies during her time at AT&T, and led the acquisition and establishment of AT&T EasyLink Services worldwide.

Finally, providing a different kind of multimedia overview is Rob Glaser, head of Progressive Networks and one of the Internet's most successful entrepreneurs. Glaser's company released RealAudio in 1995 at a time when few people had heard of 'streaming media'. Today, RealAudio claims a user base of 10 million.

Among those taking the floor at Internet World's exhibition, which runs from August 12 to 14, are networking suppliers Cisco Systems and Bay Networks, software developers Macromedia, Lotus Development and Sausage Software, and industry giants such as IBM/ASSC, Silicon Graphics, Sybase and Telstra Big Pond.

Innovative new products are also expected to be on show at the exhibition. Australian distributor Unitract Systems

These were therefore the two key areas that Kirby Network Services addressed to select conference content and speakers, he said.

Add Internet World's ability to attract key industry players, according to the organisers, and Internet World Australia Pacific 97 provides a place for users and potential users of Internet, intranet and World Wide Web technology, to get down to business.

will demonstrate version 1.4 of the Got It! Internet Accelerator at its stand. Developed in the US by Go Ahead Software, Got It! is designed to relieve bandwidth congestion on the Internet and accelerate on-line browsing by up to 500 percent.

Australian software company Odyssey Development is also demonstrating new ISYS search and retrieval software at Internet World. ISYS:web version 2.0 is a fully functional HTTP Web Server, according to the company, or a powerful search engine for existing Web servers.

Other new products include Trend Micro Australia's virus protection suite, which targets different points of vulnerability across an enterprise, and the new Congo Voice Router and high-end Tigris Integrated Access Platform on display at XSI Technology's stand.

For further information, contact Kirby Network Services on (02) 9310 5544, email info@kirby.com.au, or visit <http://www.kirby.com.au>.

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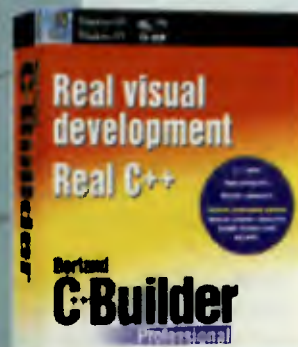
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The Dummies books began as a series of introductory manuals for PC novices. Today the Dummies empire boasts an array of books covering personal finance, parenting, cooking, wine, golf, and even sex. IDG Books Worldwide CEO John Kilcullen recently made his first visit to Australia. **By Roulla Yiaccoumi**

Who you calling a dummy?

John Kilcullen is a satisfied man. The 38-year-old Michael Keaton lookalike heads IDG Books Worldwide, publisher of the yellow, in-your-face 'Dummies' series of books. A tall man with bushy hair and a friendly face, Kilcullen took a punt on the Dummies idea six years ago in an attempt to explain technology to the uninitiated.

The gamble paid off. Today, the Dummies business is big business. Revenue for the financial year ending 1996 was \$100 million — double the previous year's figure. The success of Dummies allows Kilcullen to attract high-profile authors to write his books. Apart from technology and general-interest books, there are plans under way for a series on music, such as *Classical for Dummies* and *Opera for Dummies*.

The Dummies marketing machine has also been working overtime producing a variety of merchandise. A quick look at <http://www.dummies.com> reveals a closetful of gear — T-shirts, polo and denim shirts, hats, mouse mats, even a small plastic contortionist Dummies Man.

Sitting in the lounge of Sydney's Intercontinental Hotel surrounded by a batch of new-release Dummies books, Kilcullen prepares to sing the praises of dummydom.

APC: With your glasses on, Dummies Man (the Dummies books' mascot) bears a striking resemblance to you . . .

Kilcullen: A lot of people have commented on the physical similarities between myself and Dummies Man, but it wasn't intentional. We asked an independent designer to come up with an androgynous but likeable character. The idea is that if you check out our books, you too can get smart like Dummies Man!

APC: One point often made about Dummies books is that they are fun to read. How important is humour in your books?

Kilcullen: [Nods head] Significant. [Still nodding] Very significant. Our books have a very anti-textbook look — they poke fun and contain cartoons. People can

be left feeling very frustrated by technology — even people who would normally consider themselves intelligent! Laughing disarms people and when you can relax, it makes it easier to learn.

APC: What makes you laugh?

Kilcullen: People and the things they do. [Shaking his head] I am constantly amazed by the things people do with computers.

APC: Do you mean like using the CD-ROM drive as a cup holder?

Kilcullen: [Laughing] Yes, and the mouse as a foot pedal!

APC: Do you think some people find the term 'dummies' insulting?

Kilcullen: When I first proposed the idea of having books for 'dummies', I was told it would never work because you can't insult your readers. But 'dummies' is an affectionate term, not an offensive one.

APC: How did the Dummies idea come about?

Kilcullen: In 1987, a software retailer was telling me how people were coming into his store asking for introductory DOS books, but all the books on the market were too technical. So I thought, Why not have a DOS book for dummies? I filed that thought away until 1991 when I joined IDG Books. [It is believed the Dummies series gave IDG Books a well-needed profit boost.]

DOS for Dummies was our first book,



launched in November 1991. It's still our best seller, with 2 million copies sold. The idea was to be irreverent, to have attention-grabbing books with bright packaging and our own 'Dummies Man' who features on the cover of each book.

APC: What excites you about technology?

Kilcullen: Well, I'm not actually a big technology user. In fact, I stay away from the technology as far as possible. I even have a T-shirt I wear around the office: 'Proud to be a dummy'!

I'm definitely no Mr Black & Decker — I want to be able to relate to my customers and when you use the technology so much

Dummies online

The Web cult of stupidity

IDG Books publisher John Kilcullen maintains that the use of the term 'dummies' in the spectacularly successful how-to book series is affectionate and playful rather than cutting, vicious, nasty, stupid, weird or any combination of the above. The fact that \$100 million worth of the books were bought last year is strong evidence that readers aren't put off by being branded morons, as is the existence of copycat series like Macmillan's Idiot's Guides. But for a worldwide view of whether being a 'dummy' is a good or bad thing, there's no better place to look than the Web.

While the Dummies series of books has its own virtual presence at <http://www.dummies.com>, we needn't pay too much attention to that, as it's basically a marketing site designed to foster the whole Dummies phenomenon, not to reflect how people in the real world feel about it. (Mind you, it's worth checking in if you feel comfortable enough with your stupidity to want to buy a T-shirt with the slogan 'Dummies Rule'.)

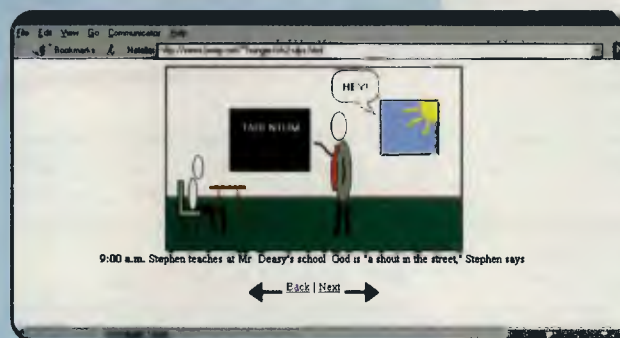
If you go searching on the word 'dummies', you'll also find a few thousand links to online bookstores trying to flog you one of the titles (including a surprising number of references to the German translations). But beyond that, there are some intriguing new takes on the Dummies genus. Overall, these suggest that most Webmasters in the world are more than happy to label potential visitors to their sites as idiots.

The largest group of 'Dummies' clone sites takes advantage of the branding's prominence to promote its own basic guides to computing or other topics. Sites that fall into this category include The World Wide Web for Dummies (<http://www.math.washington.edu/~keynes/help.html>), Bookkeeping for Dummies (<http://www.alice.net/reports/credit/bookkeep.htm>), Internet Regulation for Dummies (<http://www.zip.com.au/~pete/dum.html>) and Boy Scout Ranks For Dummies (<http://www.mvhs.srvusd.k12.ca.us/~byarkin/bsa/dummies.html>).

A second class of 'Dummies' offerings have a humorous bent. Some people have just used the branding to rebadge gags

that have circulated in email since the beginning of time, like Politics for Dummies (<http://www.henninger.com/humor/politics.html>). You might think author James Joyce is a joke; but if not, you can master all the pretentious lit-crit references you'll need to mouth off convincingly about the man at Ulysses for Dummies (<http://www.bway.net/~hunger/ulysses.html>).

A third group of 'Dummies' offerings leaves the profound suspicion that even the dimmest reader might be more intelligent than the pages' authors. Take Wellness For Dummies (<http://www.stayhealthy.com/wfd.htm>), a site that lists 12 health principles that the author



claims will "balance the budget, pay off the national debt and add 10 years to life expectancy". These tips include "Do what you must to experience at least 23 DBRU equivalents daily." Draw your own conclusions. There's also Galactaphobia for Dummies (http://www.bflrc.com/helpers/glct_dum.htm), a collection of hints on how to discourage women you know from breastfeeding.

But for the ultimate evidence that there's no shame in lacking mental capability, we need look no further than an article from *Moment* magazine (<http://www.syn2000.org/Articles/Hammerman1/Hammerman1.html>) which disputes the idea that pride in being stupid is a creation of Kilcullen's publishing empire. Writer Joshua Hammerman maintains that the Jewish people took pride in being dummies long before the IT community ever thought about it, and that this forms an important part of Jewish culture.

Angus Kidman

that it becomes second nature, it can be very hard to step back and see it from the perspective of a novice.

I think what is exciting about technology is its usefulness as a communications tool. I mean, the Internet — it's a killer app! However, we still have a huge way to go in terms of getting PCs into homes. While TVs have a home market penetration of 95%, PCs sit at only 35%. But PCs are not like other home appliances — they frustrate people and make people anxious. That's where we come in.

APC: *Sex For Dummies* must raise a few eyebrows. How successful has it been?

Kilcullen: This title isn't a provocative book, in fact, it's a responsible book which promotes safe sex practices. Worldwide, it's been very successful and has been translated into 17 languages.

APC: How did you come about obtaining the services of *Sex for Dummies* author Dr Ruth Westheimer?

Kilcullen: [Smiling] It wasn't easy. We approached Dr Ruth with the idea about a *Sex for Dummies* book and her first reaction was, 'But my readers aren't dummies!' So we showed her what the books were about and explained the idea behind them. Today, she is a big fan of Dummies books and is very proud of *Sex for Dummies* — but at the

time, we had to talk her into it.

APC: What role does reader feedback play with Dummies books?

Kilcullen: Feedback from our readers is how we stay close to our customers. Each of our books has a reader-response card in the back which we encourage readers to fill out and send back to us. We also invite email and snail mail. You know, people can get quite emotional when [they write]. Some of them are euphoric — it's a real accomplishment for them to feel they finally understand something which at first seemed so complex.

APC: On a day-to-day basis, what does your job involve?

Kilcullen: [Smiling] Aside from my role as the CEO — Chief Encouragement Officer — at IDG Books, I have two main responsibilities. I spend half my time staying close to our customers, writers, agents and the media, and I spend the other half of my time on the lookout for TNBT — the next big thing.■

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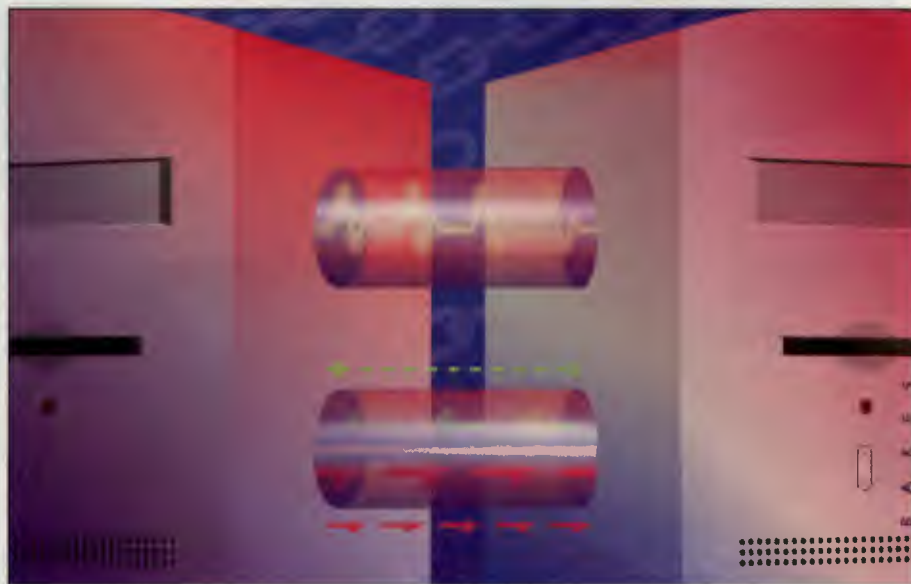
Clustering is the sharing of servers that enables lower-end machines to perform like mainframes, offering the same high availability and scalability. While it has been available on most Unix platforms for a number of years, the advent of clustering for the Wintel architecture is making the technology hot news again. **By Dominique Jackson**

Clustering takes off

Imagine you are in charge of information systems for a hotel. In keeping within your budget and skills, you have opted to run your reservations system on an NT server. During the proverbial dark and stormy night, lightning strikes, causing a failure in your server's power supply (you think!). Even though the system is down, guests keep arriving, reservation requests are made, and accounts need to be settled. Too late, you realise that, while your budget may not be a million dollars, your IT needs are just as mission-critical as those of any large organisation.

With the benefit of hindsight and only a moderate increase in the IT budget, clustering comes to the rescue. Buy another server with clustering capabilities and you immediately have the required reliability, with a handy performance increase.

Critical applications such as air-traffic control, emergency-call centres, and telecommunications hubs must be up and running 24 hours a day, 365 days a year. Any downtime risks lives and money. As evidenced by problems with Melbourne's emergency services earlier this year, for systems to meet a business's needs, they must have performance, reliability and functionality. But however fast or reliable computers are at any point in time, applications invariably demand more. Historically, mainframes, supercomputers, and fault-tolerant systems have provided the highest levels of service. Unfortunately, their specialised construction and proprietary components contribute to long design cycles and high costs. As the changing computing paradigm has driven mission-critical applications down to the workgroup level with a client/server architecture, the challenge has been to provide both reliability and performance, and to do so flexibly and inexpensively. Clustering meets this challenge.



Clustering is the connection and tight integration of two or more servers to work collectively as a single logical system, even though they are physically separate. A high-speed interconnect bus allows instantaneous data transfers between systems.

Clustering was pioneered by Digital in the early 1980s as a low-cost alternative to mainframes. Since then, Unix-based clusters have been developed by systems vendors such as Sun, SCO and Hewlett-Packard, and server vendors such as Tricord and Sequent. The first NOS-based clustering was from Novell with System Fault Tolerance (SFT) for NetWare in 1993. Clusters can range in size from two tightly interconnected SMP machines to a loosely-coupled, 1,000-node Private Virtual Machine (PVM) network, such as the 1,500-node, Internet-based cluster that worked over eight months in 1994 to break RSA Data Security's encryption key challenge.

The servers in a cluster are generally similar, if not identical, although this is

changing with emerging standardisation, and each could be used by itself to perform a particular task or set of tasks. Each server is called a 'node'. When one node fails, the other nodes take over. When a node is added or repaired, the cluster software migrates some data and computation to that node. By functioning as a single unit, clusters give an application access to many more CPUs, and the resulting reliability and performance benefit is greater than could be achieved with a single server.

Availability, rather than performance, is the reason most people implement clustering. Availability — the proportion of time that a system can be used for productive work — is typically expressed as a percentage. Typical standalone systems can achieve about 99% availability, which may sound great until you realise that the missing 1% represents roughly 90 hours — over three and a half days — of downtime a year. Mission-critical applications need to do much better than this.

Physically, a cluster of servers will

resemble two or more non-clustered servers except that they will either be linked by a high-speed interconnect cable system in addition to the normal network cable, or by a shared disk interface such as dual-port SCSI. There is no default standard for interconnect. It could be a LAN connection between two machines; a high-speed dedicated link using a LAN protocol; a proprietary dedicated link, as used by Tandem ServerNet; fibre channel-based or a bus-type connection more typical of a computer's internal bus.

How does it work?

There are two main clustering strategies: using an active secondary server, and using a passive back-up server. With the active secondary server approach, the 'secondary' server is enabled to do useful processing on other applications but is still able to take over for the 'primary' server in the event that it fails. The key benefit of this approach is that customers can still have server redundancy but don't need to buy a second server that is only ever used when the primary server fails.

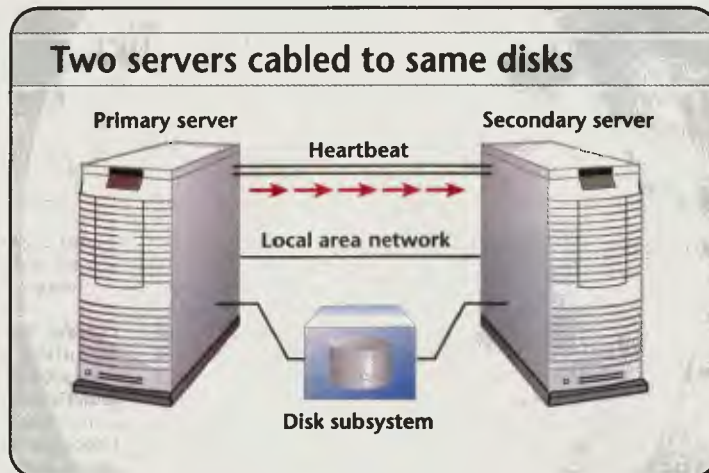
There are three variations on this approach. One type of solution is to have entirely separate servers with their own disks. With this approach, data must be constantly copied to the disks of the secondary system to ensure that the secondary system has access to current and accurate data should a failure occur. This approach delivers high availability at the cost of substantial overhead on the servers and the network.

The second variation is to have two servers physically cabled to the same disk, though one of the servers 'owns' the disks. With this approach, each server owns its own set of disks, and during normal operation, only that server may access its disks. However, in the event of a server failure, an alternate server can assume 'ownership' of that server's disks and then operate from them. This approach eliminates the need to constantly copy data over the network to a secondary system. With this approach, a disk failure could result in an extended period of downtime. To avoid this problem, installations using this architecture typically have redundant mirrored disks or use RAID technology in the disk subsystem.

Finally, multiple servers can share the same disks at the same time. During normal

operation all servers connected to the disks can share access to them at the same time. This requires locking management software to ensure that data can only be accessed by one server at a time. This approach again typically is used with mirrored or RAID disks.

The passive back-up server approach supplies a related but less cost-effective approach. The 'primary' server provides file and application services to users, while the 'secondary' server is available for use should a failure take place in the primary server. The secondary server is not being used for other useful processing. The primary server sends periodic messages (heartbeats) to the back-up server. Should these messages stop arriving at the back-up server, it presumes that the primary server has failed and puts itself into operation in place of the failed server.



The other major potential benefit of clustering is performance. In general, the use of clustering for performance is considerably less developed for PC servers than clustering for availability. The technology required to harness the capabilities of multiple servers in order to gain performance against a single application is complex and requires extensive development by the operating-system and NOS vendors.

NT clustering

Competing NT clustering technologies are being developed by Microsoft with Wolfpack, and Novell with Wolf Mountain. Although both focus on the high-availability aspects of server grouping, their approaches are quite different. Wolfpack is a Windows NT-only solution and can only handle a two-node cluster. Novell's Wolf Mountain, on the other hand, will handle larger clusters using Fast Ethernet but currently has no definite product time-

line. As yet, NT solutions are still no match for Unix clustering. While high availability will be on offer in 1997, scalability and load-balancing improvements probably won't be available until late 1998.

Wolfpack, the codename for Microsoft's Cluster Server technology, is a set of software programs and APIs that provide failover capabilities for a two-node NT cluster. Companies that are looking to cluster more than two Windows NT servers will have three choices: to seek out a proprietary clustering technology; wait until server vendors extend Wolfpack or wait for Microsoft to deliver Phase II of Wolfpack, expected next year, which will enable larger clusters of four or more servers and have support for load-balancing.

Novell has already had dual clustering for the past four years with SFTIII. This is a fault-tolerant version of IntranetWare, which, although it's never been heavily promoted, has been available since the release of NetWare 3.11. Novell recently demonstrated a 12-server Wolf Mountain cluster.

Most Unix vendors, such as IBM, DEC and HP, are offering both Unix and NT clustering. IBM will be supporting Wolfpack but is offering its own alternative, Phoenix. Scheduled for release in mid-1997, Phoenix is designed to run on NT, Unix and other operating systems, and will be available on IBM's Intel-based PC Servers in the next few months. Digital will be the only

vendor to produce Wolfpack clustering — with proprietary enhancements — on both RISC Alpha and Intel processor platforms. Since last year, the company has been offering its own proprietary Windows NT clustering solution that provides failover protection, drawing on technology first developed for its Unix machines.

Unlike Unix clustering, there was no standard for PC-server clustering until the Virtual Interface Architecture (VIA) initiative. The initiative, led by Compaq, Hewlett-Packard, Intel, Microsoft, Novell, SCO and Tandem, is a hardware and operating system-independent communication specification for a high-speed clustering interconnect. When completed, this initiative should allow users to buy hardware from their vendor of choice, rather than buying all equipment from a single vendor. The first software maker to support VIA is Microsoft, which will integrate VIA interconnect driver into Phase II of Wolfpack. ■

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Viruses are the technological scare of the information age. Easily transmitted, sometimes fatal, these electronic critters represent such a threat to personal information that antiviral software is a large and booming business.

But what exactly is the viral threat? By Ashton Mills

Infectious behaviour

Computer viruses can be transmitted over a variety of electronic media. They can inflict mild or severe damage, and they can hide, duplicate themselves and even learn to avoid detection by antiviral software. Unlike the biological kind, computer viruses are, at their core, just another program. The difference between your word processor and a virus is simply intent — the virus is a program designed to cause damage.

In this respect, viruses represent the height of programming capability. For a virus to survive it must be able to duplicate itself, avoid detection, inflict damage and be engineered to spread, all within as small a footprint as possible. The smaller the virus, the harder it is to notice before and after it does its dirty work.

Like hacking, virus creation requires skill, and few viruses are made to cause damage on a large scale. This actually ensures a little peace of mind, as many viruses are designed to be annoying, not permanently damaging. Contracting a virus and losing information because of it isn't as common as you might at first assume. Nonetheless, the threat is real and it's always safer to assume the worst and make sure your PC is virus free.

The nature of the foe

Programmers creating a virus will usually write the program in Assembler, that arcane language understood by few and used by even fewer. The reason is simple: it's fast and it's tight, exactly what a virus needs to be. However, since a virus is a program, its existence on your system is limited, like any other program, by the software you run. For a virus to be 'alive' in your system, you have to execute it. Thus viruses ensure they become active by infecting programs on your system, riding on them, and coming into being when the infected program is executed.

Viruses can affect all levels of computing systems, from laptops to mainframes. Similarly, they can be transmitted over any electronic medium, from disks to networks

to the Internet, a fact which makes tracing the author of a virus nigh impossible, unless the authors' pride causes them to leave a signature buried in the code of the virus, which some have been known to do.

Sadly, many viruses are, like their biological counterparts, designed for certain hosts or 'victims'. Such viruses are tailored for a specific host environment, and do maximum damage when entering them.

One example of this tailoring is the Bliss virus, the first virus to appear on the Linux platform. Previously, platforms such as Linux had been thought to be virus-free because bypassing the inherent security mechanisms of these platforms is relatively difficult to do. Bliss managed to infect Linux systems by using the users themselves to bypass security. Based on the knowledge that many home Linux users log into their machines as 'root' — the highest possible security level with access to all parts of the system — and that many such users make heavy use of the Internet, Bliss spread around the world on the back of a Linux game, infecting the machines of average game-playing Linux users.

Similarly, many viruses have a specific trigger to set them off, a signifier of either planned malicious damage or the eccen-

tricity of the author. One of the most well-known viruses of all time, the Michelangelo virus of 1992, triggers only on Michelangelo's birthday, March 6. Any system infected before or after this date will show no sign of having contracted the virus. To all intents and purposes, the virus is 'dormant'.

Less specific viruses merely aim to annoy the user. For example, the Australian-born 'Slow' virus duplicates itself in the same executable every time it is run and hangs around in memory slowly sucking up CPU resources until the PC slows almost to a halt. It's frustrating, but data is not damaged. Another 'harmless' virus, Puke-393 (also Australian-born) simply copies itself into as many executable files as it can, attempting to spread anywhere as fast as possible — but that's all it does. The indicator that your PC has contracted Puke-393 is the strange occurrence of executable files increasing in size.

Deciphering behaviour

Viruses can cause all sorts of damage to a system. They have been known to delete files, scramble files or directory information, modify data and format drives, cause



Virus file

Armed and dangerous

When your system crashes, you probably press Ctrl+Alt+Del automatically. But if that action were to cause your floppy and hard disk drives to be overwritten, you'd think twice about it. This is what happens when the **AntiCAD** virus triggers. Your CMOS setup may also be altered, and you may hear your PC whistling a tune such as the Blue Danube.

Over the years, we have seen a number of viruses emerge. While some appear to be relatively harmless, others are extremely dangerous. Some viruses may even appear to be cute or funny in order to mask the damage they are doing to your PC. The **Green Caterpillar** virus sits in a PC for two months before activating by displaying a caterpillar which crawls across the screen. If the caterpillar passes over any text, it changes the colour of the writing to yellow, and each time a directory is examined, the virus has a good look around for another file to infect.

Similarly, the **Flame** virus features eye-catching graphics. A variant of the **Stoned** virus (which slows down your system and affects the master boot record), Flame stores the month of infection in memory, and when the month changes to the next month, coloured flames appear on your screen while the virus overwrites the master boot record.

However, viruses minus the pretty graphics are capable of doing calculated damage to your PC. The **Ogre** virus, also known as Disk Killer, activates once your system has been on continuously for 48 hours. The following message will appear on your screen: 'Disk Killer — Version 1.00 by COMPUTER OGRE 04/01/1989 Warning!! Don't turn off the power or remove the diskette while Disk Killer is Processing! PROCESSING.' The most effective form of stopping the virus from doing damage is

to hit the off button. However, if you are too late, you will see the message: "Now you can turn off the power. I wish you luck!" which means the damage has been done — all the data on your hard disk drive has been encrypted, though not actually destroyed. A recovery program may be of some help, but several bugs in the virus make un-encrypting nearly impossible.

Mistakes in viruses are not new — it has been said that many viruses are written by poor or failed programmers! The **Frodo** virus, for example, features a bug that prevents it from carrying out its intention to modify the FAT and corrupt the hard disk drive on its annual trigger date of September 22. Instead, the virus merely hangs the PC.

With a large number of viruses, pulling the plug as soon as you see it triggering is the most effective way to reduce damage to your PC. But for other viruses, yanking the cord can be destructive. When the **Casino** virus triggers, a message appears on your screen which reads, 'WARNING: IF YOU RESET NOW ALL DATA WILL BE LOST FOREVER! Your data depends on a game of JACKPOT CASINO DE MALTE.' The virus then moves all your data to the RAM. If you were to reach for the Power off button upon seeing this message, all your data would be lost. However, if you choose to play the game (and let's face it, you don't really have much choice), you have a one-in-three chance of winning and preventing the virus from trashing the FAT.

A number of viruses will trigger on a particular day or time. The **Michelangelo** virus triggers on March 6 in any given year (Michelangelo's birthday), although this virus is not as common as it was five years ago. On this date, the virus overwrites the first 256 cylinders of the hard disk drive,

including the MBR, FAT, and root directory. Reformatting your hard disk drive is probably the quickest way to get up and running again.

Friday the 13th is usually not a day associated with good luck, and the same applies to the virus of the same name. The **Friday 13th** virus, also known as Jerusalem, places a grey rectangle about the size of a matchbox on the left-hand side of your screen which will noticeably slow down your system. The virus will then erase any programs run on this day and may also crash NetWare networks.

The keyboard can also play a key role in activating viruses. On an infected PC, the **Keypress** virus issues a string of keyboard interrupts. If you should press any keys while this is happening, you may have to kiss the data on your hard disk drive goodbye. Pressing any keys will overload your keyboard buffer, which will cause your PC to beep like crazy. Some variants of Keypress go one step further and overwrite your hard disk.

The **Cinderella** virus will trigger after a certain number of keystrokes. A hidden file known as `clnDeReL.la` is generated and your PC automatically reboots.

And if you think all email viruses are a hoax, as the Good Times and Irina 'viruses' proved to be, **ShareFun** will have you thinking twice. If you have a PC running MS Mail under Windows, you are the perfect target for ShareFun. While you work on an infected Word file, ShareFun selects three addresses from your mail book and sends an email to the three randomly selected people — adding the infected file you are working on as an attachment, and adding the header 'You've GOT to read this'.

Nasty stuff.

Roulla Yiaccoumi

slowdowns and lock-ups, blank the BIOS or CMOS and even encrypt boot-sector information, rendering hard drives unbootable. This list of charming behaviour is merely the tip of the virtual iceberg — a virus is capable of doing anything, just like any other program on your system.

Most damage is a side effect of the virus's attempt to survive, while other

forms are deliberate actions against the data on a system. Viruses are generally categorised by the methods they use to spread and survive, which also serve as indicators to the severity of their spread and the type of damage they are likely to cause. Knowledge is power, and if you know the methods a virus employs to survive, you have a better chance of avoiding or capturing them and recovering from a

virus attack. All viruses fit into at least one of the following categories:

Boot-sector viruses infect the MBR (Master Boot Record) of a system. The virus will overwrite or move the boot code, replacing it with infected code. Since the boot sector is the very first sector loaded when a machine boots, this ensures the virus will always be loaded, and makes detection and removal tricky. MBR viruses will infect

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the boot code of any writeable media inserted into the infected machine, including floppy disks and removable media such as Zip or Jaz disks.

File-infecting viruses infect executable (EXE, COM) and overlay (OVL) files. Like boot-sector viruses, file-infecting viruses will overwrite or move the 'loading' section of an executable file, inserting their own code to trigger the virus whenever the program is run. This little trick ensures the virus is unwittingly executed along with the program it infects and is normally completely transparent so there's no indication you have a virus until the damage has been done.

Some viruses infect only commonly-used files such as those associated with the operating system (COMMAND.COM, for example), while others simply infect every executable program they can find. Normally such viruses spread as more programs are executed, every program that is loaded becomes infected. Because the code the virus inserts into an executable file is *extra* code, the size of the executable will normally increase. This is one of the easiest signifiers of an infected executable, especially if the size increase on subsequent runs is a static value.

Stealth viruses also attempt to avoid detection, but do so by masking their presence. They literally try to intercept system calls from the operating system in an attempt to modify information as it is written to disk or memory, such as any changes to the size of a file which might arise from an infected file. Because these viruses must be resident in memory to do this, they can normally be found easily with the right software, although removal involves killing the virus in memory before attempting to clean any disks.

Multi-partite viruses are the most virulent of their brethren. These viruses employ more than one of the above techniques to survive, such as infecting the MBR, infecting executable files and encrypting themselves, making them prevalent and hard to remove.

Preventative measures

The best defence is, as always, prevention. There are a number of avenues open to anyone wishing to ensure their PC stays virus free, but each has its drawbacks. Considering that the real issue at hand when a virus strikes is the integrity of your

and then, once backed up, write-protect the medium you have used to store your information. More often than not antiviral software can recover infected files, but there's no guarantee, so it is better to be safe than sorry.

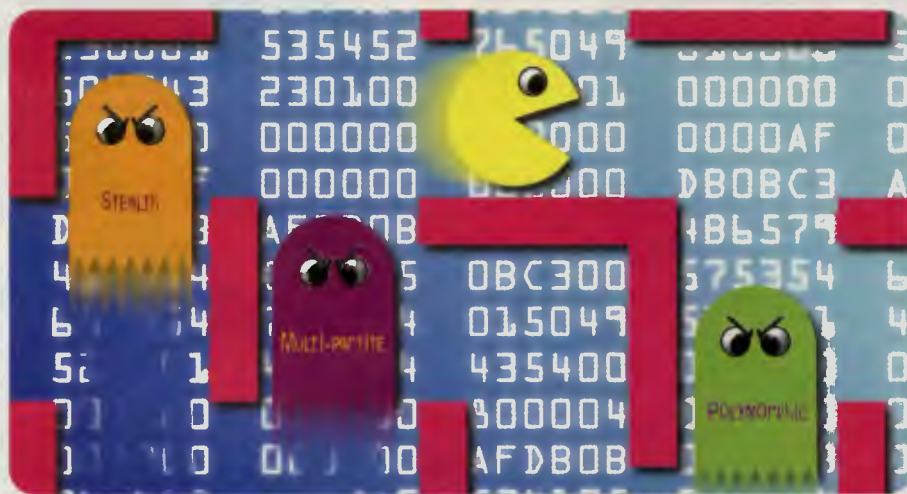
BIOS options nowadays often include an 'antiviral' feature that you can enable to prevent viruses writing to your MBR. The feature is somewhat misleading. It doesn't prevent viruses from writing to your MBR, it prevents *all* software writing to your MBR. Under normal circumstances this is a very handy feature to have enabled; because it's at a hardware level, no program will ever be able to write to the MBR without your permission. However, this often causes problems for experienced users. If you try to format or FDISK your drive, the BIOS will intercept and prevent you from making changes. If you use boot-manager software such as System Commander, you might also run into problems.

Always scan new software, be it from the Internet, a local BBS or your most trusted friend. Viruses are almost always unintentionally transmitted, and spending five minutes scanning a floppy disk is a drop in the ocean compared to the weeks you might spend trying to recover corrupted information.

Preventative scanners can often be helpful if you suspect a virus infection of a type not previously known. In theory, preventative scanners, sometimes called heuristic scanners, try to detect unknown viruses by looking for suspicious virus-like functions within files. For example, the scanner might pick up that a certain file includes code that can write to your MBR. Such scanners must be moderated with common sense; heuristic scanning often picks up a variety of files that are completely virus free and deciding to take action against these files may cause damage.

Resident scanners are virus scanners that stay in memory permanently, scanning every program you load as you load it. Such programs are the height of antiviral security but are also the most demanding. Being memory resident, they take up CPU time and memory, and since they scan every program you load for every virus in its database, each program will take longer to load on your system.

Keep a write-protected, bootable disk handy and keep some antiviral software on it. This disk will help in the detection and removal of viruses. If your system is infected, especially by an MBR virus, you will have to boot a clean system, normally



Polymorphic viruses are sneakier than their primitive cousins, and as such they are very hard to detect and remove. These viruses realise that the biggest threat to their survival is discovery by antiviral software. For this reason, polymorphic viruses attempt to hide themselves. Since antiviral software works by looking for common virus 'signatures' in files, polymorphic viruses avoid detection by encrypting themselves on disk and in memory. The encryption method changes each time the virus is executed, making it almost impossible to find the virus.

information, many of these drawbacks are a small price to pay for peace of mind.

Back up your data regularly. This is the best antiviral measure you can possibly implement. Viruses damage data, not your PC. Hardware can be bought and sold, but your personal information is irreplaceable. The only way to make sure your information will be safe even if your PC should be infected is to have a backup copy. Of course, backing up virus-infected files nullifies this safeguard completely, so you should scan comprehensively for viruses before backing up



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Mistaken identities

Like biological viruses, computer viruses can adopt various modes of behaviour, spread internally via a variety of mechanisms, and even undergo metamorphosis, with variant strains appearing when programmers add to the original virus code. However, not all damaging programs of this manner are viruses. There are a number of equally destructive programs that don't come under the heading of 'virus', although they are often mistaken for viruses.

Worms are programs designed to infect large data-processing systems to destroy or alter data. By their nature they are deliberately damaging programs, often tailored for a specific system. As such, worms are the bane of corporate bodies, and they have been used in the past as a form of industrial espionage. Unlike viruses, worms do not duplicate themselves.

Trojan horses are destructive programs travelling under the guise of something less dangerous. They do not duplicate themselves. Trojan horses are rare and, like worms, are more likely to be found in the corporate environment than in the home.

Logic bombs are purely destructive programs whose presence is often already known by the body unfortunate enough to have their system infected. They are, as their name suggests, software bombs designed to cause maximum damage triggered by a specific event. Unlike viruses, logic bombs do not duplicate themselves but, like Trojan horses, infiltrate in disguise. Logic bombs have been a tool of choice for disgruntled employees wishing to cause damage long after their departure. Or, like worms, they have been used as a destructive tool in corporate extortion.

Macro viruses are brought into being by functions already present in macro-capable software, such as Microsoft Word. The virus itself is not an individually executable program, it's merely a macro designed to carry out a series of destructive tasks such as deleting files from a drive. Its power comes from the fact that the macro language is capable of performing these functions, a capability designed to add function to programs, and whose misuse couldn't have been foreseen. Although macro viruses can duplicate themselves to other documents in the same application, they can't spread like other viruses and infect executable files on a system.

from a bootable floppy, so that you have a chance to run antiviral software without risking the infection spreading further into your system. There's no point booting an infected system to run antiviral software as you're only going to infect the antiviral software itself (which will then probably refuse to run, since many such programs check the integrity of themselves to stop the spread of a virus).

Of course, it's no fun living in fear or having your system resources soaked up by memory-resident antiviral software. There's no need to scan your drive every time you boot up, only every time you install new software that you can't be sure is virus-free. Circumstances dictate the method; if your PC is in an environment where new software comes and goes on a daily basis, a memory resident scanner might not be such a bad idea. There are varying degrees of security, so choose one that won't inconvenience you but will provide some fall-back protection.

Getting revenge

The first recorded virus attack occurred in 1987 at the University of Delaware, and for the first time made public the vulnerability of information. In the 10 years since then, an estimated 3,700 viruses have been noted, not including variants which, it is theorised, could number in excess of 10,000. Strangely enough, only around 1% of these viruses are the cause for 90% of reported virus attacks.

If the worst occurs, antiviral software is the answer. Such software comes in three main forms: memory-resident scanners, disk scanners and integrity checkers. Many software packages employ all three tactics to ensure the detection and removal of viruses.

Memory-resident and disk scanners often come as one package, the former aimed at ongoing protection while the latter deals with immediate scanning and removal. The scanners themselves work by utilising a database of known virus 'strings' (short strands of code unique to individual viruses, the proverbial electronic DNA strand of a program), which are searched upon in executable files on a system. A reliable scanner will utilise two or more such strands in order to make a definite match, ensure no false alarms are triggered, and attempt to pick up variants of a particular virus. The virus databases used by these programs can normally be freely updated on a monthly or even a weekly basis to ensure the very latest viruses strands are included in the scans.

Once found, most scanners are capable of removing viruses from files, thereby keeping the file and data intact. The removal process is basically a reversal of the infection process. Once the virus is found within a file a database of 'cleaning' information used by the scanner is drawn upon to remove specific lines of code from a file. Most of the time the process works, but it's better to be safe than sorry and replace a recently cleaned or infected file with an original from a backup. Not all viruses can be removed by such software, however, which is why backups are a necessary part of the prevention process.

Integrity checking is often an optional extra with most scanners available today. Cyclic Redundancy Check (CRC) code is generated for every executable on a drive and saved in either a centralised directory or in each directory on a drive. As the antiviral software scans, it regenerates CRC code based on the content of a file which it then compares to the previously saved CRC value. If the values differ, then the content of the file has changed. Like heuristic scanners, integrity checkers should be managed with common sense. Some programs, by their nature, may modify themselves, causing a false alarm when the integrity checker finds an anomaly. Special care should be taken to generate initial CRC values only on a clean system, otherwise the stored values of possibly already infected files won't be helpful at all.

Popular, freely-available scanning and cleaning software can be found on this month's edition of **apcmag.cd** or at the following sites:

- McAfee: <http://www.mcafee.com>;
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Going hand to hand

If your system should ever become infected by a new and as yet unknown virus it may be time to go hand to hand and attempt to remove the virus manually, without the aid of antiviral software. Such procedures are not for the faint of heart, but a little knowledge and the right tools can go a long way to recovering your system. For more information, check out the online feature 'Going hand to hand' on **apcmag.com**.

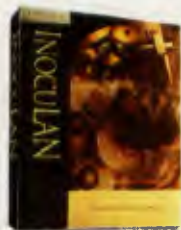
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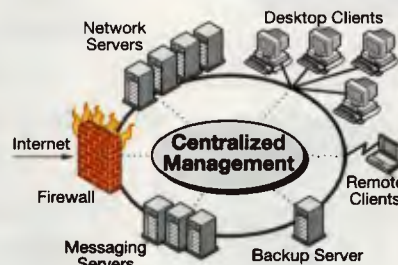
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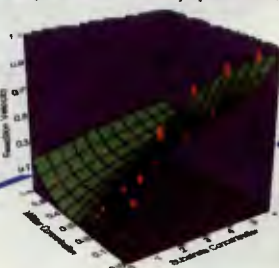
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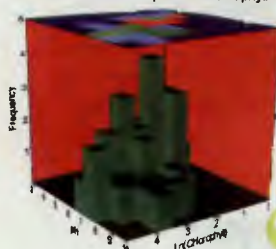
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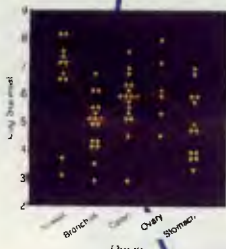
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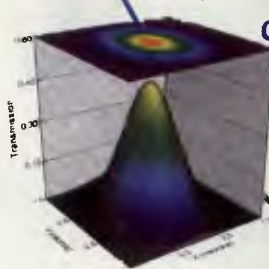
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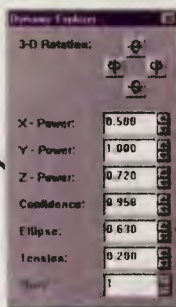


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The lines have now been blurred between drawing and vector-based programs, opening up opportunities for real creativity. **By Jim Endersby**

Pretty as a pixel

Drawing and painting programs used to fall into two distinct categories. Drawing programs were vector-based — ideal for hard-edged, clean graphics. However, they couldn't do things like smudging and blurring or creating the effect of transparency (not easily, anyway).

Bitmap-editing programs such as Photoshop allowed effects like blurring, stylising and adding transparency, but they were not so hot at handling type or creating 3D effects.

The current trend in drawing program is to marry vector-based and bitmap-editing tools to create powerful hybrids that can produce a much wider range of artwork than was previously possible. All the programs reviewed here (except FreeHand) allow you to select all or part of your drawing and convert it into a bitmap. Once that's done, you can apply painterly effects, instead of exporting your graphic as a bitmap, importing it into another program, adding filters and effects, then re-importing it back into your drawing program.

CorelDRAW and Micrografx Designer also include separate bitmap-editing applications that allow you to create bitmap images from scratch, and Canvas tries to combine full-blown painting and drawing tools into one program. Despite their different approaches, it's clear that the days of separate bitmap and vector tools are coming to an end.

There are other kinds of convergence going on between these programs. Each publisher obviously keeps an eye on its competitors and makes sure that its product doesn't fall behind. This constant catch-up can be something of a headache for the user. Apart from the cost of upgrades, there's always the nagging anxiety that the grass might be greener elsewhere, which has to be weighed against the hassles involved in learning a new program and converting all your existing files across to a new one. (The bad news here is



that none of these programs does a very good job of importing its rivals' files.)

Given the potential problems, how do you decide if and when it's worth switching, particularly when the different programs offer many of the same features?

Perhaps the best approach to making this decision is to work out what sort of user you are and then find out what sort of user each program expects. This may sound a little odd, but each of these programs seems to have its own ideas about what sort of person will be using it.

CorelDRAW, for example, is stuffed with helpful hints, wizards, tutors and clip art. For a beginner this is all very helpful, but it may explain why there seems to be some hostility towards CorelDRAW among those who consider themselves professional designers — all those wizards and clip art imply that Corel users can't draw. Adobe's Illustrator, by contrast, is a rather austere program: there are no cheery, pop-up hints, nor are there gigabytes of clip art.

Adobe seems to feel that its users will be offended by too much hand-holding.

However, given that Illustrator and CorelDRAW offer many similar features (far more than most of us will ever master), does it matter whether we are the right kind of user? Perhaps not, except that Corel has put its efforts into ease of use and automating complex tasks, while Adobe's work seems to have gone into bulletproof PostScript output (it's the only program reviewed here that offers PostScript 3.0 support).

If most of your work is printed out on the office laser or your home inkjet, CorelDRAW's ease of use will be a big advantage, but if you are sending complex colour files straight to the printer or bureau, Illustrator may be a better bet. The individual reviews clarify what kinds of task each program does best.

.....
Jim Endersby is a freelance Web designer and electronic publishing consultant.

CorelDRAW 7

COREL

Version 7 (which shipped late in 1996) was the first upgrade to CorelDRAW which managed to add new features while at the same time running faster than the version it replaced (in particular, file saving and opening were much improved). Version 8 will probably enter beta testing any day now (if it hasn't already), but on past experience it may be worth waiting for a maintenance release before upgrading. The README file for the latest, free maintenance release (Revision B, or Build 467, which was used for this review) listed dozens of minor fixes.

Corel should be applauded for addressing all these issues, but it is unfortunate that it needed to. While it's inevitable that such a complex program will throw up the occasional glitch with some obscure combination of hardware and software, it is possible that Corel's relentless upgrade schedule (a major new version every year) contributes to the problems which some users experience. However, this version didn't crash once during testing.

Version 7 adds a number of significant new features. It has a cleaner interface which takes up less of your screen with toolbars and menus while still keeping everything accessible. Many of the tools are now simpler and more intuitive to use.

For example, the new transparency tool allows you to make an object transparent by simply clicking and dragging. Transparent fills can be uniform, graduated, textured or patterned, plus almost unlimited variety can be created by overlapping different transparent fills. You can even add a graduated multicoloured fill (which Corel calls a fountain fill), to a



fountain transparency, with the transparency and fountain running in different directions. CorelDRAW's transparency tools are much more sophisticated than those in any of the other programs reviewed.

The ability to convert its own vector-based artwork into bitmaps and then apply bitmap effects (including any standard Photoshop-compatible plug-ins) is another new feature in this version. This,

combined with the ability to import and manipulate a wide variety of bitmap file formats, allows CorelDRAW to perform many tasks that would previously have required a separate painting/image editing program. You can even add transparency to imported bitmaps.

However, if the bitmap editing features aren't enough for you, Corel has included PhotoPaint 7 in the box as well, which should provide enough power for virtually any bitmap-editing task.

CorelDRAW's creators have gone to a lot of trouble to make the program easy to use. There are various kinds of hints and help built in, including templates and wizards (which walk you through the creation of various standard documents), a floating 'Hints' window (which changes as you select different tools and objects),

and CorelTutors (brief lessons on all the major aspects of the program). The combination of ease of use with professional power is unique to CorelDRAW.

Corel's philosophy seems to be to automate complex tasks as much as possible, and this approach has been implemented throughout CorelDRAW 7. Complex operations, such as creating 3D extrusion effects, are implemented via a simple dialog box which, like most of the dialogs, can be left open or 'rolled-up' to reduce screen clutter. There are also lots of preset macros to create common effects, but if you can't find the effect you want, you can record your own macros which can then be edited using CorelScript.

In fact, CorelScript is far more than just a macro editing tool: it allows users who have the skill to write fairly complex programs complete with dialog boxes which can even be compiled as stand-alone EXEs or DLLs. Scripts can be invoked via customised menus or keyboard shortcuts and almost every aspect of the way CorelDRAW 7 looks and works can be customised by the user: you can add menus and commands or even write your own plug-in additions to the program. It's hard to say how many designers will have the required skills and patience to use such features, but no-one can accuse Corel of not offering its users plenty of choices.

Previous versions of CorelDRAW had a reputation for creating output problems and while a lot of care has gone into improving this aspect of Version 7, the first

How we tested

We used two computers: a Pentium 133MHz with 32M of RAM and a 1G hard disk, and a Pentium Pro 200MHz with 64M of RAM and a 2.5G disk. Both machines had Matrox Millennium graphics cards (with 4M of RAM). Each program was put through a series of common drawing tasks and a standard test file was created with each one (which involved such tasks as importing and formatting text, importing a bitmap, and creating a simple logo). The test files were all exported as EPS and TIFF files and imported into PageMaker and Photoshop. None of the programs failed the tests.

It's worth noting that none of these programs will run under Windows 3.x — they are all 32-bit programs and require one of Microsoft's more recent operating systems. They were all tested under Win-



dows 95 (OEM Service Release 2) and Windows NT 4 (Service Pack 2). We found a significant improvement in performance under Windows NT, particularly when several programs were running at once. Under NT it was quite possible to be downloading a file via the modem while running PhotoShop, Word and one or more of the test programs — but running the same programs on the same computer under Windows 95 led to a noticeable loss of performance. Given that graphic designers, desktop publishers and Web designers all tend to run lots of programs at once, Windows NT looks certain to be the platform of the future for electronic publishing — particularly in the light of Apple's continuing problems with its next-generation operating system.



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● Editor's Choice CorelDRAW 7

● Highly Commended Illustrator 7

Given its combination of power, ease of use and value for money, CorelDRAW remains the best overall choice, especially now that the minor bugs in the first release have been addressed. However, professional designers may want to look closely at Illustrator, particularly because of its cross-platform support, high-quality output and exceptional typographic abilities (especially the support for non-Roman character sets).

file we sent to the bureau for output — a single-page, black-and-white advert — created an unspecified error. Such problems are hard to pin down and the error might not be CorelDRAW's fault, but it is also possible that its output problems haven't been entirely solved in this version.

Like previous incarnations of CorelDRAW, Version 7 comes complete with a whole suite of applications, clip art, fonts and utilities on no fewer than four CDs. There isn't space to review all of these here, but there's no doubting the value for money the package represents.

Not surprisingly, a full install of the whole package eats up frightening amounts of hard disk space, so think twice before opting for the 'typical' install option. However, you can set up the programs to run from the CD-ROM drive, with only a few core components being installed on your hard disk.

The performance is slightly better than in Version 6, a remarkable achievement given the number of new features; however this is a very powerful program and like any comparable program it does need a powerful computer to run. Its performance on the Pentium 133MHz was quite acceptable, but if you're planning to work on really big, complex files, a Pentium 200MHz is a better choice.

■ Distributor Corel Customer Service

■ Phone 1800 658 850

■ Online <http://www.corel.com>

■ Price \$822; upgrade \$430

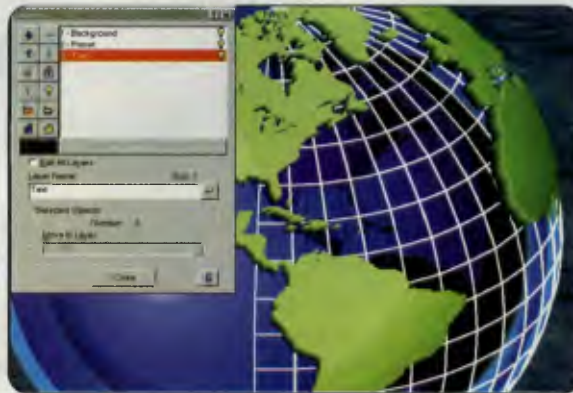
■ In short A major upgrade to a powerful program, which is faster and more stable than its predecessors.

Designer 7

MICROGRAFX

This is a relatively minor upgrade from Version 6 of Designer, and Micrografx has chosen to concentrate its efforts on improving compatibility with Microsoft Office. For example, if you have any of the Office applications installed on your computer when you install Designer, it will give you the option of adding a button to the Office toolbars, which allows you to quickly start Designer (or the other applications in the bundle). The look and feel of the program is deliberately similar to that of the Office applications and wherever possible common shortcut keys and terminology have been used.

This focus on Office compatibility suggests that Micrografx envisages its program being used mainly by beginners and relative amateurs, not professional designers. It has included extensive online help and tips, plus wizards, templates and a slew of clip art. All of this combined with its decision to bundle several applications (notably FlowCharter, Picture Publisher



and Simply 3D) into a graphics suite suggests that Micrografx sees CorelDRAW as its main rival, rather than programs like FreeHand and Illustrator.

However, while CorelDRAW offers features that will appeal to both beginners and professional designers, the latter would probably not choose Designer. It's full of small but nagging shortcomings. Objects temporarily disappear when you 'nudge' them with the arrow keys, which makes precise positioning a clumsy process.

Similarly, while you can set text to flow automatically around a shape, you can't adjust the distance between the object and the text. And this 'repel' function doesn't work at all with bitmaps (either imported ones or those created within Designer). Designer doesn't offer anything like the transparent fill options in

CorelDRAW (but then, nor do any of the other programs reviewed), and while you can create 3D extrusion effects, the process is clumsy by comparison with CorelDRAW.

It's a shame that Designer has removed the 3D tools which made Version 4 so exceptional. The bundled Simply 3D program has some very impressive options (including VRML support) and very fast rendering, but it would be wonderful to have these powerful tools built into Designer itself. Ironically, Micrografx suffered slightly from putting Version 4 too far ahead of the pack — at the time, it was simply too slow for the average user's hardware, although today's computers would probably handle the combination of 2D and 3D tools very well.

Nevertheless, Designer does have some very impressive features. It offers both master pages and layers, which combined with its well-conceived multipage features, makes creating presentations and slide shows especially easy.

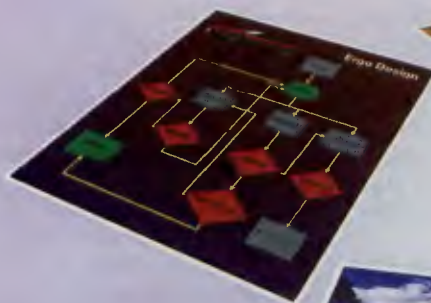
Another nice feature is what Designer calls 'smart colourisation'. This allows

you to select a group of objects which are all coloured with shades of red and change them to blue. Instead of changing them all to the same shade of blue, Designer will do a pretty good job of matching the intermediate shades, so that shading or blending effects are preserved. This is especially useful when you need to create a series of similar objects in a range of colours, such as a set of buttons for a Web page. Designer allows you to draw one, dupli-

cate it, and then change its colour without losing your carefully constructed 3D bevels.

Speaking of the Web, Designer has a number of features specifically aimed at Web designers, such as optimised palettes and support for common Web graphic formats. It will also calculate typical download times for your graphic, showing you a comparison of different file formats at various common modem speeds. The fastest option is invariably Micrografx's proprietary Quicksilver format — all the tools you need to create and view Quicksilver graphics are included with Designer, but anyone who wants to view the results on your Web page will need to download the free Quicksilver viewer.

Another useful feature when creating Web graphics is the document audit.



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Designer will check your files for potential problems and alert you to common problems such as graphics that are too large or that could be downloaded more efficiently if a different format were used.

On the slower of the test systems Designer's screen display was sluggish. Its tabbed dialogs popped up rather slowly, but this was only a minor problem. Designer is a robust tool with plenty of useful features and some clever ideas, but it has several shortcomings and lacks any really compelling features to distinguish it from its rivals.

- **Distributor** Micrografx
- **Phone** 1800 644 298
- **Online** <http://www.micrografx.com>
- **Price** \$545; upgrades \$195 (from Version 1 of the Graphics Suite), \$245 (from previous versions of Designer)
- **In short** A solid but unspectacular upgrade aimed squarely at the office market rather than the professional design community.

FreeHand 7

MACROMEDIA

FreeHand is the main competitor to Illustrator on the Macintosh platform, but like Illustrator it has had a hard time breaking CorelDRAW's stranglehold on the Windows market. This latest version (again, like Illustrator) is being released simultaneously on both platforms in part because a lack of cross-platform compatibility remains one of CorelDRAW's real weak spots (CorelDRAW for Mac is still only up to Version 6 and it doesn't appear to have sold all that well).

Like all the other programs reviewed here, Freehand7 has put much of its effort into enhanced Web support. Not surprisingly, it has made its own Shockwave format a central part of its Web strategy. FreeHand includes an Afterburner Xtra ('Xtra' is FreeHand's term for a plug-in), which saves your files in a special compressed format that allows them to be viewed using the Shockwave browser plug-in.

The benefits of putting vector-based graphics on your Web site, as opposed to the current bitmapped ones, like GIF and JPEG, is that they can be resized to fit different screen resolutions, users can zoom in to see more detail, and they are smaller than equivalent bitmapped files would be. The 7.02 update to FreeHand (which is available free from Macromedia's Web site) further enhances FreeHand's Web-oriented features by adding support for

Macromedia's Flash 2 Web graphics format. The dinosaur sample artwork supplied with FreeHand, for example, is a 509K FreeHand file, but when exported as a Flash file it comes down to 220K — obviously, that's still too big for a Web site but it gives you an idea of the compression ratio. (For more information on Flash, check out <http://www.macromedia.com/shockzone/edge/flash/>)

Other improvements in Version 7.02 include improved GIF export features, including anti-aliasing, interlacing and a variety of options for reducing the size of files by manipulating the palette. Minor improvements have also been made to improve compatibility with Photoshop 4, and there are about a dozen small bug fixes.

FreeHand 7 also includes enhancements to the auto-trace function which allows imported bitmap files to be converted into vector files. But rather surprisingly FreeHand is the only program reviewed here that can't convert its vector artwork into bitmaps within the program. You can export FreeHand graphics as bitmaps and then re-import them, and you can import bitmaps from other programs and apply standard Photoshop plug-ins to them within FreeHand, but neither approach is as simple or well integrated as those offered by FreeHand's main rivals.

However, to some extent FreeHand's



bitmap limitations are overcome by some very innovative features called Xtra Tools. For example, you can interactively roughen the edges of a shape (such as a rectangle or polygon) to create a random irregular edge, or you can smudge an object (effectively creating a blend to white in one step). In both cases these are vector effects and you're left with vector artwork at the end, but the effects are very like those you'd normally associate with bitmap-editors.

Other Xtras include: a series of path

options similar to those found in Illustrator, which allow shapes to be combined, intersected, clipped and so forth; a graphing tool (once again, similar to Illustrator's); distortions (such as the ability to add an envelope around a series of shapes); blends; and the Afterburner and Flash options. Many basic features such as colour trapping are implemented via Xtras and one benefit to this approach is that individual Xtras (or related groups) can be switched on or off. Switching off Xtras you rarely use makes FreeHand quicker to launch.

Another similarity between FreeHand and Illustrator is the way they separate basic tools, such as rotate or scale, from the selection tool, and the separation is just as irritating in FreeHand as it is in Illustrator. By contrast, the approach taken by CorelDRAW and Designer is much simpler and more intuitive — when you select an object, dragging on the handles scales it and a second click allows it to be rotated or skewed.

FreeHand includes Kodak digital colour matching (as do CorelDRAW and Illustrator), which allows you to get a more accurate match between your screen display and the final printed output. You can also create and edit scripts using the bundled Macromedia Script editor, which uses Sun's Java language to create scripts. This is potentially very powerful, but the catch is that you need to know Java before you can write a script. You can't just record and replay commands within FreeHand, which is one way of using Corel's scripting tools. There are some free sample scripts available from Macromedia's Web site to get you started, but Java is not for the faint-hearted.

Apart from its inability to convert its own graphics into bitmaps, FreeHand has all the tools a designer needs. It's also stable and reasonably responsive — it's certainly a little snappier than Illustrator — but it shares Illustrator's slightly cumbersome approach in one or two places. Its Web tools are the best on offer. The ability to create animated GIFs within the program would have been the icing on the cake, but none of its rivals have that feature either and the Shockwave support will appeal to many designers. Although we've only reviewed FreeHand itself, the standalone price for FreeHand is high compared with the FreeHand studio,

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which includes xRes, Extreme 3D and Fontographer. Existing FreeHand users will find upgrading to the Studio package well worthwhile, and if you're new to Web design, it's definitely worth evaluating. However, it's hard to see a really compelling reason to switch to FreeHand if you are currently using CorelDRAW or Illustrator.

- **Distributor** Mitsui Computer
- **Phone** 1800 801 811
- **Online** <http://www.macromedia.com>
- **Price** \$669 (FreeHand only); \$799 (FreeHand Studio);
upgrade/crossgrade \$249
- **In short** A solid, well-designed program, but lacking a few useful features that its competitors offer.

Illustrator 7

ADOBE

In the 10 years since Illustrator first appeared it has become the most widely used professional illustration tool on the Macintosh platform. However, while its stablemates Photoshop and PageMaker have managed to cross over to Windows successfully, Illustrator has so far failed to make much impact.

The reasons are easy to see: the last release of Illustrator for Windows was Version 4.1. It lacked many of the features that its rivals offered, but it was also badly out of step with the Mac version of Illustrator. The cross-platform compatibility of Photoshop and PageMaker was a major reason for their success, but until now Illustrator for Windows has been three major upgrades behind its Mac cousin.

However, Version 7 is shipping simultaneously on both platforms, restoring complete cross-platform compatibility. While the changes for Mac users will be relatively minor (Illustrator 6.5 already had many of these features), the changes for Windows users are nothing short of spectacular.

When Illustrator 4.1 shipped, Windows 95 was just a twinkle in Bill Gates's eye, but the world has changed since then — Version 7 is a fully 32-bit application which runs equally well under Windows 95 or NT. It makes full use of the Win32 interface conventions, such as context-sensitive right-mouse-button menus and long file-names, and it incorporates OLE 2 capabilities (but only as a server, not a container).

The most obvious changes from the previous version are in the interface, which has the same look and feel as Photoshop 4 and PageMaker 6.5, especially the chunky, 3D palettes, which are tabbed so that several different functions can be packed into

each one. Palettes can be 'docked' together so that they are locked one under another and can be moved as a group. You can also separate the tabs and recombine them in whatever way you find useful.

As well as giving Illustrator's palettes a new look, Adobe has added many new ones. The new Layers palette offers all the features Illustrator's rivals already have — layers can be hidden, printed, concealed and reordered — but one useful original feature is that each layer has its own colour. This means that when you select an object, its handles are in the layer colour, which allows you to see at a glance which layer it's on. The same colour is also used for guidelines which by default are specific to the individual layers, but if you prefer a single, common guideline layer you can always create one.

Gradients can be created or edited via another new palette, but they can also be edited interactively with the gradient tool. They can be applied by dragging and dropping the gradient swatch onto an object, and dragging a gradient onto the swatches palette allows you to save it for future use.

Another major new feature is the



Pathfinder command, which allows objects to be combined in 10 different ways. Shapes can be welded together, intersected, or clipped out of each other. Pathfinder commands include a 'hard' and 'soft' option, which controls how overlapping colours will appear on screen. This allows the result of printing overlapping colours to be previewed on screen.

Version 7 also adds new text handling features, but again some of them involve merely catching up with Illustrator's rivals. However, the ability to apply smart punctuation such as ligatures, em dashes, and quotation marks is a more innovative feature, and Illustrator is the only program reviewed here which allows users to create multiple master font instances on

the fly within the program.

Adobe has decided to give Illustrator its own font-rasterising abilities, presumably to allow for double-byte character support, which is needed by non-European alphabets such as Japanese and Korean. However, this is a mixed blessing for those users who don't need this feature because it bypasses Adobe Type Manager's ability to manage fonts in groups. Every one of the 300 free fonts supplied with Illustrator is available every time you start the program, which slows down loading and creates a rather unmanageable font list. However, this approach does mean that you can choose which fonts are available to all Windows programs and which of the weird and wonderful freebies will only show up in Illustrator.

Adobe has catered to the needs of Web designers and has added enhanced RGB colour support plus all the common Web graphics formats (such as GIF, JPEG and PNG). Illustrator can also create image maps by assigning a URL to an object within Illustrator, but rather surprisingly you can't choose pixels as your measurement units when creating Web artwork.

Illustrator's strengths are precision and accuracy. Virtually every command and option can be carried out either interactively or by typing in precise measurements, coordinates or percentages. In a few instances this makes its tools a little clumsy; for example, it seems odd to have to select an object and then switch to a scaling tool to resize it, and then another tool to rotate it. Most of Illustrator's rivals streamline these operations with a single tool.

The only real problem with Illustrator is speed. It has been enhanced since the beta we previewed (see *APC* July, page 34), but it's still the slowest of the programs reviewed here. Once launched, Illustrator offers plenty of power and precision for professional designers, but not much help for beginners. It is clearly intended for serious users with serious computer power at their disposal. If you fit into that category, you will find Illustrator 7 a most impressive upgrade.

- **Distributor** Adobe
- **Phone** 1800 065 628
- **Online** <http://www.adobe.com>
- **Price** \$895; upgrades \$199 until September, then \$249; crossgrades \$445 until September
- **In short** A powerful, professional tool that is well suited to professional design, but may be too slow and complex for the average user.

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Integrated graphics software

Canvas 5

In some ways, Canvas is the odd one out in this review because it isn't simply a drawing program; it's intended as an integrated graphics environment which combines desktop publishing, drawing and painting features in one package. However, given that the other programs reviewed here have also begun to break the drawing mould, we thought it would be interesting to see how Canvas compared, since it has been straddling these boundaries for some time.

This new version of Canvas has a new and very impressive professional appearance: the packaging, documentation and the splash screen (which displays while the program is starting up and changes each time you run Canvas) are all much slicker than in previous incarnations, which always had a rather 'cheap and cheerful' look. However, this new look hasn't quite carried over to where it's needed most: the program's interface. Canvas's dialog boxes and menus seem designed to take up as little screen space as possible, but this makes them look rather cramped on a high-resolution display. And the icons in the tool box are also rather hard to read at high resolution.

Canvas has a good selection of basic drawing tools: ellipses, rectangles, lines, polygons and stars. There are also one or two useful advanced tools. For example, you can add dimension lines to objects (for scale drawings) and use 'smart' lines, which resize themselves when the objects they connect are moved or resized. These are particularly useful for creating flowcharts and other diagrams. You can also draw cubes in one pass, but not other 3D shapes. To create these you need to extrude an object.

Extrusion is one area where Canvas is very strong. As well as simple extrusion for creating things like 3D text, Canvas offers circular and 'sweep' extrusions. All extrusions can be rotated in 3D and all can have natural lighting effects. The program also offers a very useful array of basic painting tools (pens, brushes, eraser, airbrush and so forth) and a similar array of useful desktop publishing features (such as text and paragraph styles).

Another innovative feature is the ability to choose which tools will be available when starting the program. By holding down the space bar during startup you can

choose to load all or some of the tools. Leaving only a bare-bones toolset speeds up loading considerably (and Canvas is already very quick), and you can create custom toolsets for specific jobs, so that you only see the tools you need. This should be particularly welcome for users with older or slower computers.

However, Canvas's integrated environment is not quite as well designed as it should be. For example, when you create a new document you must specify whether you're creating a publication, a drawing or a slide show. Depending on which you choose, different options are available within the program. In a publication you can have master pages and column guides, which allows desktop publishing tasks to be accomplished easily, but you can't have multiple drawing layers. These are only available in drawing mode (where you can't have multiple columns).

The lack of layers in publication mode is irritating because you can't lock the guidelines while you're working. In order to



avoid accidentally moving the guides whenever you move an object that touches a guideline you must hold down the Control key. The same problem occurs in drawing mode, because the guides can't be assigned to a layer which can then be locked — they remain floating whatever you do. This is cumbersome, to put it mildly.

The lack of layers in publication mode is partly compensated for by the fact that you can import Canvas documents into each other very quickly and easily. So if you have

a complex illustration to do, it can be created as a drawing and then placed into a publication (or slide show), but document-wide layers (as in PageMaker 6.5) would have been a better option.

All this fuss about layers and guides might seem trivial, but these minor problems are symptomatic of the way Canvas works. In trying to be all things to all users, it fails to do any one thing really well. Perhaps this is inevitable in an integrated package and Canvas is obviously a lot cheaper than buying, say, Illustrator, PageMaker and Photoshop. However, its features fall well short of these three packages combined, yet — as the layers issue illustrates — Canvas doesn't offer a really well-integrated environment either.

While Canvas ran well under Windows 95, it did have a problem with PostScript fonts under Windows NT: Canvas is currently not compatible with Adobe Type Manager (ATM), as NT and PostScript fonts won't show up in its font menu.

There is no problem with ATM under Windows 95. You can get around this problem relatively easily however, by converting your PostScript fonts to TrueType ones. Windows NT will do this for you.

In general, Canvas offers a good selection of useful tools and is one of the fastest programs we reviewed. It would be entirely suited to small office or home use, where the user doesn't have the time or money to master several different programs. However, if you are a professional designer, you'll probably find it doesn't perform any one of its tasks quite well enough to satisfy you.

- **Distributor** Pica Software
- **Phone** (03) 9388 9588
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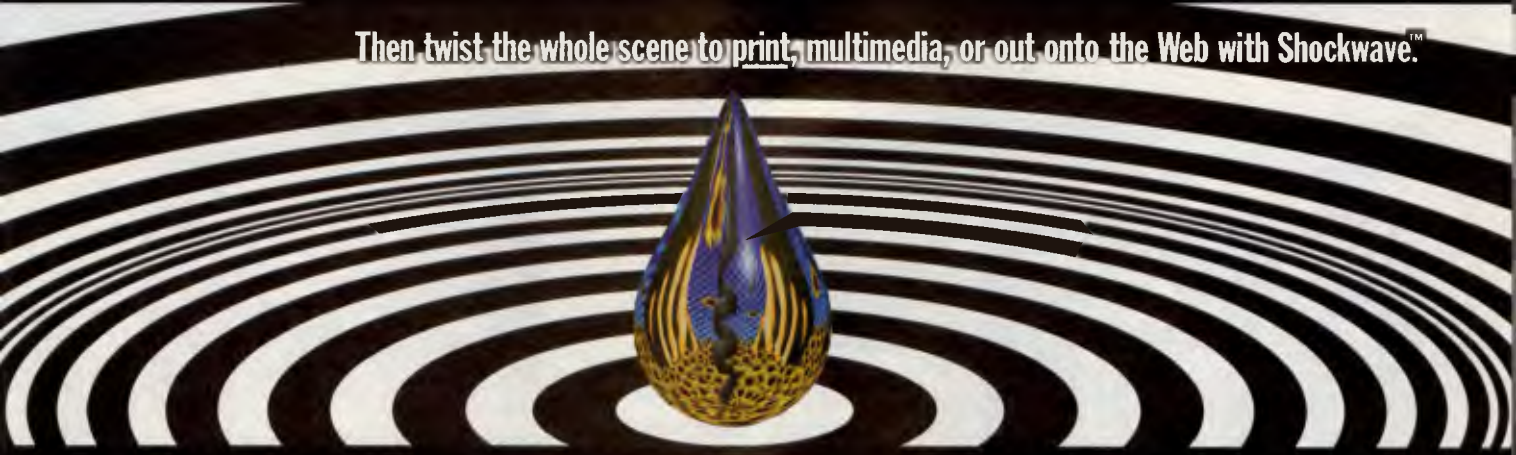
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Move into top gear with the latest 166MHz MMX notebooks. By Roulla Yiacoumi

Top-notch notebooks

Could you justify spending \$12,000 on a notebook computer? No? What if it was a really fast, feature-packed, top-of-the-line notebook? No? How about \$8,000? \$6,000?

For many people, spending the type of money that would normally buy a small car is completely out of the question in the case of a notebook computer. To the heavy mobile user, however, notebooks in this price region are essential business tools. This type of user typically requires a feature-packed, performance-driven, quality-made machine; one that will travel well and can be used for presentations. In short, a machine with the latest technology.

The technology is the MMX processor and the top-of-the-line notebooks are sporting it. With Intel Pentium 166MHz CPUs these notebooks are powerful little machines. An MMX processor has a 16K primary cache, as opposed to a non-MMX processor's 8K, which means that even though you are not using software specially designed to take advantage of the MMX processor, you should still notice an improvement in raw performance. The MMX instruction set also allows a number of instructions to be processed in parallel, making it an ideal platform for multimedia and other number-crunching applications.

One problem notebooks have always suffered from is that once you bought a notebook, you were always stuck with the same processor, no matter how much RAM you added. The introduction of Intel's Mobile Modules Operation (MMO) module is set to change that. Once future-generation processors become available, it will be a matter of sliding one processor out and putting the new one in. The Gateway Solo 9100XL was the only notebook using this technology at our time of testing.

That said, it appears the 166MHz processor will be here for a little while longer. A Pentium II processor for mobile units is not expected until at least 1998, making it harder for vendors trying to

push the notebook as a complete desktop replacement.

The first problem is getting the Pentium II processor to an acceptable size for notebooks (extra-slim notebooks in particular). Then there are the heating problems generated by the faster CPU. Lastly, there is the issue of controlling the amount of power needed by the Pentium II, so that an acceptable battery life still exists.

We invited leading notebook vendors to submit their top-of-the-line Intel Pentium 166MHz MMX notebooks for inclusion in this review. The only requirements were that the machines had to be running Windows 95 and have 32M of RAM. The one exception to this was the Dell LM M166ST. Due to its RAM configuration, this notebook could not be tested with 32M of RAM, so tests were conducted using 40M. Be sure to take this into account when comparing results.

Notebooks were received from Acer, Compaq, Dell, Digital, Gateway, Hewlett-Packard, IBM, NEC, Sharp, Texas Instru-

ments and Toshiba. On the technology front, we were happy to see some of these notebooks incorporating high-resolution 13.3in screens, internal modems, and 10x CD-ROM drives. We are also seeing smart lithium ion batteries providing better mobile power on the whole, and quite a few of the notebooks came with a 512K secondary cache. However, we were disappointed to see that four of the 11 notebooks came standard with a one-year warranty, rather than the more acceptable three-year coverage offered by the rest. Be aware that spending lots of money on a notebook doesn't always guarantee the best back-up support available. Travellers should also be aware that most of the warranties are return-to-base rather than onsite.

In all, we looked at 11 of the best notebooks around with a combined value of almost \$100,000. Some of the asking prices of these machines may largely restrict them to corporate or government budgets.



AcerNote Nuovo 32/3100

ACER

At almost three hours, the battery life of the Acer AcerNote Nuovo 32/3100 was the longest of all notebooks submitted for this review. However, the AST Ascentia P40 (reviewed in April, page 131) holds APC's all-time battery life record of three hours and 43 minutes.

Acer's AcerNote Nuovo scored some impressive test results. Landing the top position in both the Business Disk WinMark (887.5) and High End Disk WinMark (3,040), the AcerNote Nuovo proved it has number-crunching power far above its competitors. The second-place-getters in these tests (IBM ThinkPad 760XD and Gateway SOLO 9100XL) were well behind the AcerNote Nuovo (scoring 753 and 2,140 respectively).

The AcerNote Nuovo's 1.1M EDO video RAM and NeoMagic video controller returned a respectable Business Graphics WinMark 97 result of 44.1, a fraction under the average of 44.2. Also just under the group average was its Business Winstone 97 result of 33 (the average was 33.5) and its CPUMark32 of 314 (average: 316).

A curvily-designed machine, the AcerNote Nuovo features a 2.1G hard disk drive with 256K secondary cache and 12.1in active matrix TFT. The notebook is capable of holding up to 64M of RAM.

When the lid of the notebook is opened, the keyboard lifts to a tilt and the power comes on automatically. Unlike the IBM ThinkPad 760XD, the tilting keyboard cannot be adjusted to a lower position. A generous soft-touch keyboard sits at the top of the machine, with plenty of palm rest space below. The touchpad was a tad too sensitive for our liking, and pushing the click buttons required a rather deliberate effort. Speakers mounted on either side of the opening keyboard hinge give reasonable sound quality, but the sound becomes tinny when the volume is raised.

At 4.3kg, the AcerNote Nuovo was one of the heavier notebooks we reviewed. The unit features a 10x CD-ROM drive and an external floppy drive which is connected to the machine via a cable. The unit we tested came preloaded with Windows 95, but Windows NT is also available. The notebook is bundled with Lotus SmartSuite and

PC-cillin antivirus software, and also comes with a three-year international warranty, one of the best warranties offered.

Sliding in at just under \$8,000, the AcerNote Nuovo is one of the better Acer offerings we have seen, and will appeal to the mobile user looking for good performance at a fair price.

Roulla Yiacoumi

■ Distributor	Acer Computer
■ Phone	(02) 9870 1999
■ Online	http://www.acer.com.au
■ Price	\$7,999
■ In short	Good overall performance, with a superb battery life and three-year international warranty.

Presario 1082

COMPAQ

The Presario 1082 was one of the first MMX notebooks to enter the Australian market (see APC May, page 36). The Presario's early arrival may well be the reason the 1082 suffered in our benchmark comparison against newer systems. In our overall Business Winstone 97 test, the Presario limped home last with a score of 28.6. It also

had one of the slowest hard disks, scoring 574.4 in the Business Disk WinMark test and 1,740 in the High End Disk WinMark.

While all of the notebooks in this review have 166MHz Intel MMX Pentium processors inside, there was a performance difference when we tested the Presario 1082's CPU subsystem (CPU, cache and memory) with the

CPUMark32 test. It sat on the bottom rung with the slowest CPU subsystem in the comparison.

The 10x CD-ROM in the notebook also fared poorly compared with other 10x drives. In first place, the Toshiba Tecra 740CDT's 10x drive scored 1,920 thousand bytes per second in our CD-ROM WinMark test compared to the Presario's 791 thousand bytes per second.

The Presario 1082's lithium ion battery lasted a modest two hours and 13 seconds, which was the fourth-longest battery time from these power-hungry notebooks. At 3.9kg, this unit was of average weight among the range we reviewed. While it didn't perform well against the other



- **Editors' Choice** Gateway 2000 Solo 9100XL
- **Best Value** Dell Latitude

Gateway 2000 has pulled out all the stops to produce an excellent notebook at a competitive price. Not only does the Solo 9100XL integrate cutting-edge technologies, such as USB and Intel's MMO daughtercard, the standard specifications (3G hard disk drive, 13.3in active matrix TFT screen, 4M of EDO VRAM, plus three-year warranty) were also very impressive.

At over \$2,000 less than the Solo 9100XL, the Dell Latitude LM M166ST should prove almost irresistible to the notebook buyer who wants an inexpensive notebook without compromising on performance. Its performance levels ranged from the middle to top of the results, giving this notebook the highest bang-for-buck rating in the review.

notebooks, this multimedia notebook has plenty of features.

The most distinctive aspect of the notebook's design are the twin speakers that are so prominent they stick out when it is shut. These speakers use a technology called PremierSound and provide more bass than you would normally get from a multimedia notebook. In between the speakers and just below the touchpad mouse is a set of CD-audio controls similar to those found on a home hi-fi system. A user can fast forward, rewind and play an audio CD track without having to go into the Windows settings. An



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external volume control is mounted on the right-hand side of the notebook.

Like all notebooks in this test, the Presario 1082 uses an Intel Pentium 166MHz MMX processor, combined with 256K of pipeline burst secondary cache. The model APC tested incorporated 32M of EDO DRAM for the main memory, but can only be upgraded to a maximum total of 48M. Storage is provided by the 1.4G EIDE hard drive and a 128-bit NeoMagic graphics processor that uses 1M of EDO of video memory.

The 12.1in active matrix screen was a pleasure to behold, but unlike some others, this LCD display could only run at a maximum resolution of 800 by 600. Compaq provides a one-year onsite warranty. **Lachlan Botticchio**

■ Distributor	Compaq
■ Phone	(02) 9911 1800
■ Online	http://www.compaq.com
■ Price	\$7,898
■ In short	While it lacked performance, the Presario 1082 had the best speakers and sound quality.

Latitude LM M166ST

DELL

In some respects, the Dell Latitude LM M166ST was in a class of its own. Because of its unique RAM setup, we had to test the unit with 40M of RAM, so bear this in mind when considering the benchmark results. Despite this increase in RAM, it was the cheapest of the sys-

tems we tested. Its results weren't bad either.

While not best of the bunch by any means, the unit provided consistent, average results. Its best result was in the Business Graphics WinMark 97 test, where it achieved a score of 55. This placed it second behind the Gateway Solo 9100XL, which achieved a score of 59.2.

The Dell placed a promising third in the Business Winstone test with a score of 36.2, just one point behind the leader (Gateway Solo 9100XL again). Its score in the CPUMark32 test ranked it sixth, just above the average. It again ranked sixth in High End Disk WinMark, with a score of 1,970. This was below average, but the results were skewed by the Acer

How we tested

APC Labs tested the notebook computers using the Ziff Davis benchmark-testing software Winstone 97, WinBench 97 1.1 and BatteryMark 1.0. Winstone and WinBench were run once on each notebook as it came out of the box. The results that were achieved give an indication of what level of performance a user could expect using the system without any optimisation. Each machine was then optimised before a further two tests were run. The figures were averaged and the best results were used. BatteryMark was run three times, and an average taken.

Each notebook was weighed with its battery and power supply, as well as any drives such as the CD-ROM and floppy drives.

What the tests mean

Winstone 97 is a 32-bit, application-based, system-level benchmark for testing the overall performance of PCs running Microsoft Windows 95 or Windows NT. Winstone 97 evaluates the performance of the PC by running a series of scripted activities on real-life applications, recording the time taken to run each script and computing a relative score for each application. The applications used by Winstone 97 can be divided into business and high-end tests and include word processing, graphics and database programs.

WinBench 97 is a system-level benchmark for measuring the performance of the PC's processor, disk, graphics and CD-ROM subsystems.

The **Business Graphics WinMark 97** isolates and evaluates the performance of the graphics subsystem. It does this by emulating the graphic processes used by the business applications in the Winstone 97 test software. This is done by profiling the Graphics Device Interface (GDI) calls made by Winstone 97, recording them to a log file and then playing them back through a graphics replay engine. We tested the systems at a resolution of 800 by 600 with 256 colours. The results are presented in the same manner as Winstone 97 — a unitless score for Business Database, Business Publishing and Business Spreadsheet/Word Processing, and an overall score for the Business Graphics WinMark 97. Higher figures represent better graphics performance.

The **Business Disk WinMark 97** measures the performance of the disk subsystem based on the operations performed by the business applications used in Winstone 97. This includes the

hard disk, controller, device drivers, caches and I/O bus. The results are reported in thousands of bytes per second. The higher the number, the better the transfer rate of the disk subsystem.

The **High-End Disk WinMark 97** test is a more intensive test concentrating on the machine's ability to process high-end or specialised applications such as 3D visualisation. A machine needs to have 32M of RAM to run these tests.

The **CD-ROM WinMark 97** determines the transfer rate of the CD-ROM based on the operations performed when using leading CD-ROM applications. The applications used can be split up into three groups: Business and Productivity, Games and Entertainment, and Reference and Education. WinBench 97 generates a result for each application and uses a weighted harmonic mean to calculate the average transfer rate in thousands of bytes per second. The higher the result, the better the performance.

The WinBench 97 **CPUMark32** test measures the performance of the PC's processor subsystem; this includes the CPU, RAM, RAM cache and memory bus. The CPUMark32 test reflects how well the processor subsystem handles typical 32-bit requests. The CPUMark32 result is a relative, unitless score; the higher the score, the better the processing performance.

BatteryMark 1.0 is used to measure how long the battery is capable of sustaining power to a notebook that is running a processor, disk and graphically-intensive test script. Before the test is run, the battery is conditioned to ensure that it is optimally charged and does not suffer from the effects of battery memory. (If a battery is not fully discharged and then recharged, the total amount of power left in the battery will diminish over time.) The ZDigit II, a device that repeatedly hits the space key, is used to ensure the notebook does not go into hibernation or sleep mode during the test.

These battery results represent a worst-case performance scenario. In actual use, your notebook battery's power may last twice as long, depending on how the machine is being used and the level of power management employed.

Further information and ordering details for the benchmarks used are available from <http://web1.zdnet.com/zdbop/>.

Stuart Bowman and Roulla Yiacomou



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AcerNotes Nuovo's mammoth score of 3,040.

The most disappointing score the Dell achieved was in the battery tests. The lithium ion battery lasted one hour and 53 minutes. However, a second battery can be placed in the options bay to extend battery life.

The notebook is relatively compact and slim, weighing 3.8kg. The 12.1in active matrix TFT screen provided clear, sharp images. Unfortunately, the unit only provides for a maximum internal resolution of 800 by 600. The touchpad used on the system was a little finicky. Often a movement, rather than a double-tap, would trigger an operation. The Windows 95 keyboard setup is spacious, with an ample wrist rest provided. Two small speakers are located above the keypad, with an LCD status display panel in the centre. A small microphone sits in the bottom right-hand corner of the screen.

Two PC Card slots are located on the left-hand side of the machine, as are an AC adapter connector and audio jacks. The options bay, located on the right-hand side of the machine, allows you to use either the floppy disk or the 10x CD-ROM drive. An extension cable allows you to externally connect the floppy drive.

While the notebook we tested used a 1.4G IBM EIDE hard drive, you can upgrade to a 2.1G drive. The RAM setup in the unit didn't allow us to test the unit with 32M of RAM, but as some of the tests required at least 32M, we tested with 40M of RAM. (The RAM can be upgraded to a 72M maximum.)

An optional port replicator can be purchased for \$277, and a 33.6Kbps PSION modem costs \$450. The unit includes a leather carry case and a one-year, return-to-base warranty. The system comes installed with Windows 95, and free phone support is available for the life of the product.

Not a bad deal, particularly if you are interested in saving money up front.

Selina Mitchell

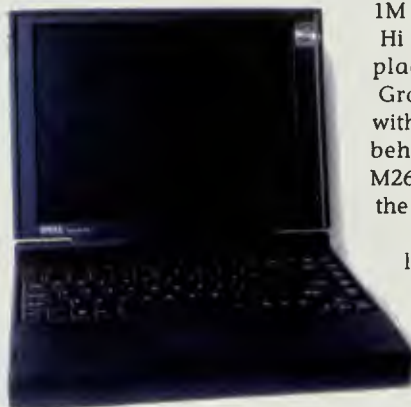
- **Distributor** Dell Computer
- **Phone** 1800 808 312
- **Online** <http://www.dell.com/intl/apcc>
- **Price** \$5,615
- **In short:** Well worth considering, but remember it had a RAM advantage.

Hi Note VP 575

DIGITAL

A consistently good performer in all our tests, the Digital Hi Note is a worthy but pricey notebook. The Hi Note VP 575 was one of four notebooks to offer a mere one-year warranty, compared with the others' three-year coverage.

A 2.1G EIDE hard disk drive returned some very good results. A Business Winstone 97 result of 37 placed it a fraction behind the Gateway Solo 9100XL's top score of 37.2. The unit also took second place in the CPUmark 32 test with a result of 348, behind the Sharp PC-9800T on a score of 358.5.



The NeoMagic 2093 with 1M of VRAM powered the Hi Note VP 575 to third place in the Business Graphics WinMark 97 with a result of 54.4, just behind the Dell LM M266ST on 55, which used the same video controller.

Thanks to its smart lithium ion battery, the Hi Note VP 575 ran for an average of two hours and 49 minutes, just five minutes

less than top scorer Acer's

AcerNote Nuovo 32/3100.

One handy feature of this 3.6kg notebook is its combined CD-ROM drive and floppy drive. Both drives sit together in one removable unit on the right-hand side of the notebook, with the floppy sitting below the CD-ROM drive. You'll appreciate the convenience of this feature if you've lugged around a notebook plus a cable and external floppy drive, or taken your machine somewhere with only a floppy drive inserted, to find that a CD-ROM drive was needed. This drive sits in an expansion bay which can accommodate a second battery instead if desired.

The 12.1 active matrix TFT screen was one of the best, offering 800 by 600 resolution. A vertical LCD status display is on the right-hand side of the screen. A microphone sits in the bottom left-hand corner under the screen. The navigational device is a touchpad, with the right-click button above the pad and the left-click button below. Sitting in the middle of a roomy palm rest area, the Hi Note VP 575's touchpad is easy to control and navigate. Above the spacious keyboard, in either corner, sits a set of internal stereo speakers.

The unit was the only one to come with a 12x CD-ROM drive. However, our tests showed it certainly wasn't the fastest; six of the 10x drives bettered its performance. In all, it's a confident notebook, but there are other notebooks offering similar features, better performance, and longer warranties, with much smaller price tags.

Roulla Yiacoumi

- **Distributor** Digital Corporation
- **Phone** 132 393
- **Online** <http://www.pc.digital.com.au>
- **Price** \$9,153
- **In short** A robust machine but a fraction pricey considering its features, performance and warranty.

2000 Solo 9100XL

GATEWAY

If you want a notebook with an enduring battery, large 13.1in display and a price tag that won't send you broke, the Gateway 2000 Solo 9100XL fits the bill.

Gateway 2000 submitted a pre-production model of this multimedia machine for our review, and it performed very well against the competition.

The only machine with 4M of video RAM (with a Chips and Technologies video controller), the Gateway 2000 Solo 9100XL scored the highest Business Graphics WinMark 97 score of 59.2, with the Dell Latitude LM M166ST trailing on 55. The rest of the Solo 9100XL's results were also very favourable.

Its Business Winstone 97 result of 37.2 placed it in top position, with the Digital Hi Note VP 575 close on its heels with a score of 37.

The Solo 9100XL's 3G EIDE drive with 256K secondary cache pulled in a third-place Business Disk WinMark 97 result of 727, behind the Acer AcerNote Nuovo 32/3100 on 887.5 and IBM ThinkPad 760XD on 727. The unit



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- Designed and built in Australia by ASP

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What are you looking for in a notebook?
APC gives you the most requested specs of a notebook at a glance, based on the machines featured in this review:

LONG BATTERY LIFE

Acer AcerNote Nuovo 32/3100 (2:54)
Digital Hi Note VP 575 (2:49)

LARGE 13.1-IN SCREEN

Gateway Solo 9100XL
NEC Versa 6200
Toshiba Tecra 740CDT

LIGHT WEIGHT

HP OmniBook 800CT 5/166 MMX (2.6kg)

LOW PRICE

Dell Latitude LM M166ST (\$5,615)

LARGE 30-HARD-DISK DRIVE

Gateway Solo 9100XL
IBM ThinkPad 760XD
Toshiba Tecra 740CDT

HIGH RAM CAPACITY

Gateway Solo 9100XL (192M of SDRAM)
IBM ThinkPad 760XD (104M of EDO)
NEC Versa 6200 (128M of EDO)

SIZE OF SECONDARY CACHE

HP OmniBook 800CT 5/166 MMX
Sharp PC-9800T
Texas Instruments TravelMate 6160

INTERNAL MODEM

IBM ThinkPad 760XD
Texas Instruments TravelMate 6160
Toshiba Tecra 740CDT

VIDEO RAM

Gateway Solo 9100XL (4M of EDO VRAM)

QUALITY SOUND

Compaq Presario 1082

went one better in the High End Disk WinMark test, grabbing second place, again behind the AcerNote Nuovo.

The Solo 9100XL uses Intel's Mobile Modules Operation (MMO) module, a CPU daughtercard that integrates the processor, cache and part of the chip set. According to Gateway 2000, this will allow the company to quickly adopt new processor generations as they become available for notebooks.

Like the Digital Hi Note VP 575, the Solo 9100XL features a 'combo' 10x CD-ROM and floppy drive, with both drives sitting in the one unit, the floppy below the CD-ROM drive. The unit, which is located on the left-hand side at the front of the machine, sits in the notebook's option drive bay, which also accepts a second battery. The Solo 9100XL's one lithium ion battery lasted two hours and 42 minutes.

On the features front, the Solo 9100XL offers a great deal. As well as the standard ports (serial, parallel, VGA), there is an infra-red, PS/2, and joystick port, as well as a PCI docking connector and NTSC/PAL in/out video jacks. There is also a microphone, headphone, line in/out jacks and dual USB connectors. Two Type II or one Type III PC Card can be accommodated by this unit.

The Solo 9100XL features one of the roomiest keyboards of the machines

tested, with a touchpad sitting in the middle of a large palm rest area. The 13.1in active matrix TFT display, with a 1,024 by 768 internal resolution, is very good. And if it's more RAM you want, this machine can take an expansive 192M (three 64M modules). Included with the Solo 9100XL is Microsoft Office 97 (professional edition). On the downside, the Solo 9100XL, along with the Toshiba Tecra 740CDT, was the heaviest notebook, weighing in at a shoulder-sagging 4.4kg. It has a three-year, return-to-base warranty with lifetime technical phone support. In all, the Solo 9100XL offers a stack of features, without compromising on performance, for a very fair price.

Roulla Yiacoumi

- **Distributor** Gateway 2000
- **Phone** 1 800 061 594
- **Online** <http://www.gw2k.com.au>
- **Price** \$7,800
- **In short** A feature-packed performer, and well-priced to boot.

HP OmniBook 800CT 5/166MMX

HEWLETT-PACKARD

Weighing in at a tiny 2.6kg, the HP OmniBook 800CT 5/166MMX was almost half the weight of some other notebooks in its class. However, it lacked the punch to make it a truly attractive mobile offering.

Although it's easy to carry around, make sure you don't stray too far from a power supply — the OmniBook's lithium ion battery lasted just one hour and 38 minutes. This was the weakest battery performance in the group, although the Sharp PC-9000T lasted barely 10 minutes longer.

Hewlett-Packard has done a good job of packing as many features as possible into this little machine, but it doesn't have a CD-ROM drive. A 10.4in active matrix TFT screen, the smallest in the group, proved a very good viewing platform. The notebook also features a 2.G EIDE hard disk drive, 1.8M of EDO video RAM, 32M of RAM (upgradable to 80M) and suspend mode for power saving.

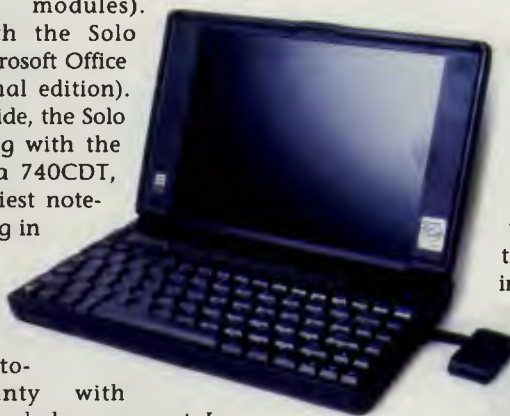
Despite its size, the keyboard was surprisingly comfortable. One drawback was the incorporation of the on/off key into the top right-hand corner of the notebook — a spot traditionally reserved for the backspace key.

To be able to keep its machine as compact as possible, HP has forgone the traditional touchpad or trackpoint with click buttons, and has chosen a pop-out mouse.

When the mouse button — a separate key that sits above the main keyboard — is pressed, a miniature mouse pops out from the right-hand side of the notebook and works in the same way a traditional desktop mouse operates. People with large hands may find the small mouse takes some time to master.

A floppy drive is externally attached via a cable, and the notebook features ports you'd expect to find on a standard-sized unit — VGA-out, serial, infra-red, docking, SCSI and printer ports, audio jacks, as well as PC slots for two Type II or one Type III cards. Underneath the notebook there is a thoughtfully-provided plastic slot for a business card.

As it was one of three notebooks with a



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John Villani - Chief Engineer, Planet Studios, Australia's premier recording studio.

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512K secondary cache, we expected the performance of the OmniBook to be better. In most of the tests, the OmniBook ranked in the last three positions, although it did manage a couple of good results. Its CPUMark32 of 344 was the third-best result, behind the Digital Hi Note VP 575 and Gateway Solo 9100XL (both oh 348) and group leader Sharp PC-9800T (on 358.5). Its Business Graphics WinMark 97 of 44.8 (ranked fifth) was just above the average result off 44.2, but still a fair way from top scorer Gateway Solo 9100XL's result of 59.2.

At \$7,776, the OmniBook was the third cheapest machine in our review group. If you will be using this notebook primarily as a travel machine and can live without a CD-ROM drive, you may find the HP OmniBook 800CT 5/166MMX an adequate unit.

Roulla Yiaccoumi

- **Distributor** Hewlett-Packard
- **Phone** (02) 9898 7831
- **Online** <http://www.hp.com.au>
- **Price** \$7,776
- **In short** A small, light notebook, let down by very average performance and the lack of a CD-ROM drive.

ThinkPad 760XD

IBM

The acclaimed ThinkPad series of notebooks from IBM is headed by the 760XD — a sleek, robust black-cased machine backed by a three-year international warranty.

The notebook has a tilting keyboard that can be adjusted to a flat position. The keyboard incorporates a red trackpoint that is easily the best navigational device of all the test machines.

The ThinkPad 760XD produced a mixed bag of results, doing very well in some tests and not so well in others. Its 3G removable hard disk drive, powered along by 256K secondary cache, returned a high Business Disk WinMark result of 753, which placed second behind the Acer AcerNote Nuovo 32/3100. A fourth-place result of 2,085 in the High End Disk WinMark was above average, but still a long

way behind the leader, the AcerNote Nuovo, which scored 3,040.

A Business Graphics WinMark 97 result of 35 placed the notebook ninth, ahead of the Texas Instruments TravelMate 6160 and Toshiba Tecra 740CDT, while its CPUMark32 score of 313 placed it eighth, just behind the Acer AcerNote Nuovo 32/3100 on 314. The ThinkPad 760XD incorporates integrated MPEG-2 hardware support providing full-motion, full-frame video with no freezing or slowdown — just like watching TV!

The lithium ion battery lasted a reasonable two hours and three minutes, just like the Toshiba Tecra 740CDT, and the notebook can hold two batteries simultaneously for extended mobile use.

The ThinkPad 760XD's 12.1in active matrix TFT screen with 1,024 by 768 internal resolution was one of the best overall. A sliding panel to the right of the screen adjusts brightness as required.

The function keys sit in a separate row above the main keyboard, and arrow keys in a separate group below. (The Page Down key sits just above the backspace key, which takes some getting used to. At first, when furiously typing away, it is very easy to all of a sudden jump to the next page without realising you have accidentally hit the wrong key). Two click buttons reside below the space bar in the centre of the small palm rest area. An LCD status panel and sliding volume control sit above the function keys, while a small but highly effective speaker sits in each front corner.

Pushing forward two keys in the front corner of both the side panels effortlessly lifts the keyboard up so that the internal components (CD-ROM drive, battery, hard disk drive) can be easily accessed. The CD-ROM drive, which sits on the far left-hand side, occupies the area known as the UltraBay, which can also hold a floppy drive or second battery. Both the battery and hard disk drive are also removable. Beneath the hard disk drive there is a black sheet that lifts to reveal the memory slots, capable of accommodating up to 104M of EDO RAM.

A floppy drive is attached to the ThinkPad 760XD via an external cable. IBM would do well to consider incorpo-

rating a floppy/CD-ROM drive 'combo' unit, such as those used in the Digital VP Hi Note VP 575 and the Gateway 2000 Solo 9100XL. A 28.8Kbps internal modem is bundled with ThinkPad 760XD. In addition to the standard ports, there are MIDI/joystick, infra-red, and video in/out ports.

Lotus SmartSuite is included with the ThinkPad 760XD, and for a limited time IBM is offering this notebook with an extra 16M of RAM (48M total) and a carry bag.

Roulla Yiaccoumi

- **Distributor** IBM
- **Phone** 132 426
- **Online** <http://www.pc.ibm.com/thinkpad>
- **Price** \$9,495
- **In short** A powerful offering from IBM, ideal for the professional user.

Versa 6200

NEC

The most notable feature of the NEC Versa 6200 is its large display. It was only one of three notebooks submitted for review with a 13.3in active matrix TFT screen. But this large screen comes at a cost. Not surprisingly, the Versa was one of the heaviest units in this review, weighing in at a hefty 4.3kg. At \$9,225 it was also one of the most expensive in the test range.

The system's performance in our benchmark tests was adequate, but not spectacular. Its fourth-place result in the Business Winstone 97 test, with a score of 35, was its most impressive result. The scores, however, were close — the Gateway Solo 9100XL led the field with a score of 37.2, and the Compaq Presario's last score was 28.6.

In the CPUMark32 test, the NEC Versa achieved a below-average score of 311,



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which placed it third last. In the High End Disk WinMark it placed fifth with a score of 1990. The NEC came in just below the average in the Business Graphics WinMark 97 test. The system uses a Chips and Technologies video controller chip, supported by 2M of EDO VRAM. Its lithium ion battery lasted just over one hour and 45 minutes, which positioned it third last.

The unit includes 32M of EDO RAM (expandable to 128M) and its Intel Pentium 166MHz, MMX-enabled processor is supported by 256K of secondary cache. It uses a 2.1G EIDE Toshiba hard disk drive. The disk capacity can be doubled by installing a second hard drive in the VersaBay II options bay.

Sound is supplied via an ESS 1788 16-bit sound-card and dual stereo speakers, which are located on either side at the top of the keypad. While APC has found problems with NEC glide pads on previously reviewed machines, this one was a welcome change — it was a serviceable, steady, manoeuvrable pointing device. There is ample wrist room provided, and the arrow navigation keys are slightly separate from the rest of the keypad for easy access.

The NEC Versa was the only notebook submitted that didn't accommodate the floppy disk drive and the 10x CD-ROM drive simultaneously — you must place one or the other in the drive bay located at the front of the unit. This could be a little frustrating for some users.

On first startup the system will dual boot Windows 95 and Windows 3.11, and it comes with a three-year, return-to-factory warranty. Overall, the weighty system is also a little hefty on price, particularly when its performance is considered. However, part of that purchase cost reflects the use of the latest and greatest screen technology.

Selina Mitchell

■ **Distributor** NEC

■ **Phone** (02) 9930 2000 or 1800 812 796

■ **Price** \$9,225

■ **Online** <http://www.nec.com.au>

■ **In short** A large screen and good warranty, but not the best performance.

PC-9800T

The PC-9800T was the second-cheapest MMX notebook in this review at \$7,695, beaten only by the Dell Latitude, which was more than \$2,000 cheaper.

For your money, you get a system that runs an Intel Pentium 166MHz MMX processor and a large 512K of secondary cache. It was this cache that contributed to the fastest CPUMark32 in our tests, a blistering 358.5. Although it's able to handle up to 64M of EDO memory, the PC-9800T that APC tested contained 32M.

The Sharp's 2.1G EIDE hard disk did not fare well, sharing the bottom of the performance ladder with

the Compaq Presario 1082. Results of 594 and 1,630 thousand bytes per second in the Business and High-End Disk WinMark tests were well below what you would expect from a notebook of this class.

The PC-9800T's graphic subsystem comprised a Trident Cyber 93850 chipset that combined with 2M of EDO DRAM video memory. This proved a successful combination, giving the 9800T a fourth-placing Business Graphics WinMark score of 53.1. The Sharp PC-9800T managed a result of 33.9, which was just 0.5 above average for the systems reviewed in this comparison.

The notebook incorporated a very good 12.1in active matrix TFT screen supporting a resolution of 800 by 600dpi. Sharp's LCD screens are made using a super-high-aperture technology that Sharp claims uses one third less power and is 60% brighter than standard LCD technologies.

The 10x CD-ROM drive inside the unit was the third fastest in the review, clocking 1,630 thousand bytes per second, and coming in just behind the CD-ROM drives from the Toshiba Tecra 740CDT and the Texas Instruments TravelMate 6160.

A real disappointment in the Sharp PC-9800T's performance was the battery-life test result of only one hour and 46 minutes. This poor battery life can be attributed to the fact that the 9800T was the only MMX notebook we reviewed that used the older nickel metal hydride (NiMH) battery technology.

The Sharp PC-9800T uses a stan-

SHARP

dard touchpad for GUI control. The 9800-CT is a full multimedia system with 16-bit audio and speakers built into the chassis.

Sharp provides a three-year international, return-to-base warranty on the PC-9800T, which may be handy for globetrotting executives who don't mind the short battery life.

Lachlan Botticchio

■ **Distributor** Sharp

■ **Phone** (02) 9830 4600

■ **Online** <http://www.sharppusa.com>

■ **Price** \$7,695

■ **In short** One of the cheaper notebooks, the Sharp PC-9800T was an average performer covered by an attractive three-year warranty.

TravelMate 6160

TEXAS INSTRUMENTS

After the Toshiba Tecra 740CDT, the Texas Instruments TravelMate 6160 was the most expensive notebook at \$9,899. Unfortunately, it was also one of the most disappointing performers, scoring below average in all the tests except the CD-ROM tests, where its 10x drive managed second position behind the Tecra.

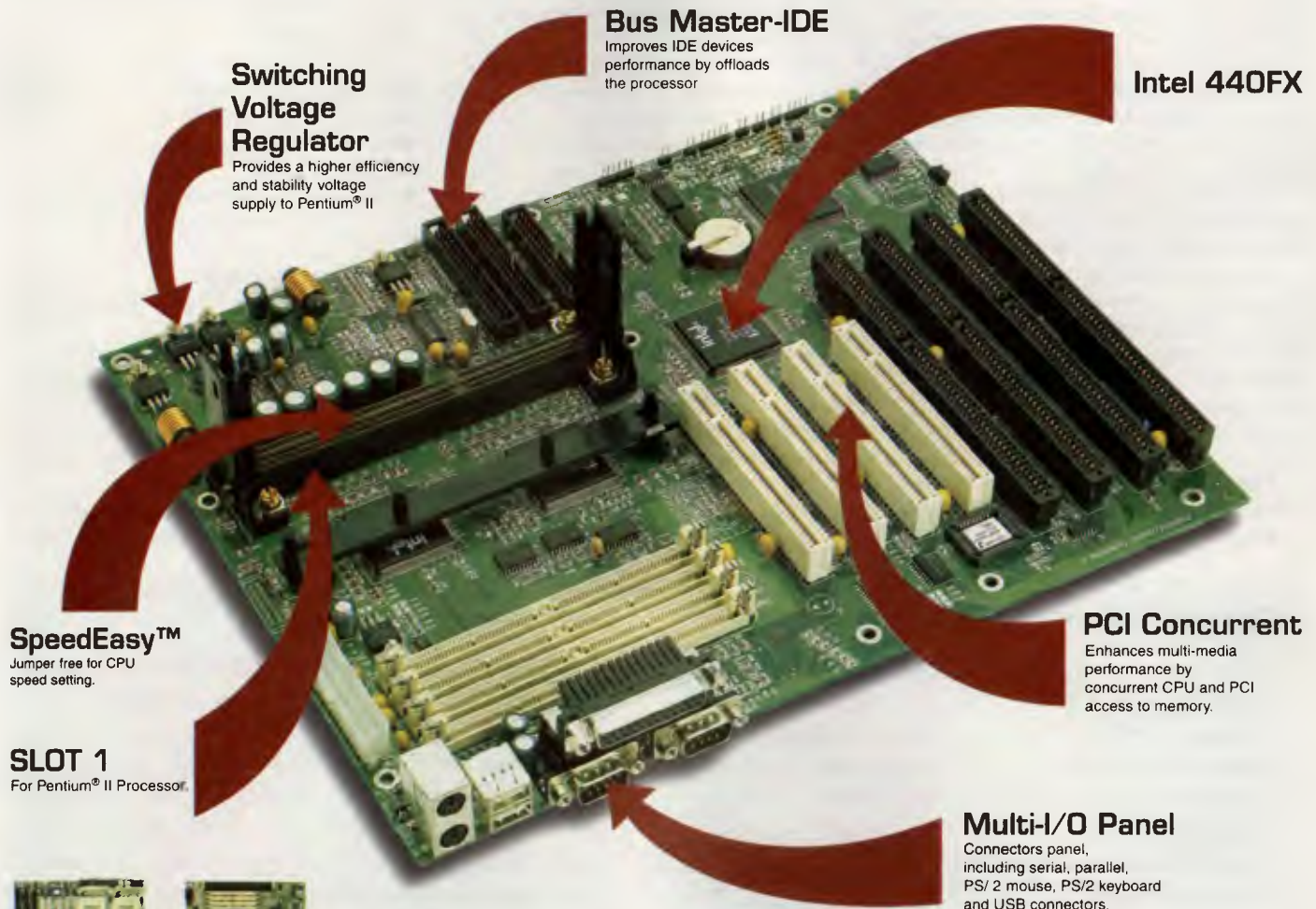
Particularly disappointing were its Business Winstone 97, CPUMark32 and Business Graphics WinMark 97 results; the unit ranked second last in all three tests. The Business Winstone 97 result of 28.7 was only marginally ahead of the Compaq Presario 1082, which managed a score of 28.6. Even with 2M of EDO video RAM and a NeoMagic 128-bit video controller, the TravelMate 6160's Business Graphics WinMark result of 31.8 was ahead of the Toshiba Tecra 740CDT's poor effort of 26.2, but still a long way behind the average of 44.2. The High End Disk WinMark result of 1,810 was also below the group average of 2,023.

The TravelMate 6160 features a 2.1G



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EIDE hard disk drive with a 512K secondary cache and 32M of RAM expandable to 96M. Unlike the other machines where adding more RAM is a matter of turning the notebook upside-down, unscrewing a panel and inserting the memory, adding RAM to the TravelMate 6160 involves removing the keyboard to access the memory slots.

The Windows 95 keyboard itself, while well-spaced, rattles and becomes quite noisy when the operator is typing quickly. Like the IBM ThinkPad 760XD, the TravelMate 6160 uses a trackpoint navigational device which sits amid the G, H and B keys. The click buttons consist of a large oval button (left click) sitting above a smaller rectangular button (right click). In either corner of the palm rest space sits a speaker.

The TravelMate 6160 was one of three notebooks to come with a modem, a 33.6Kbps Hayes Optima. The notebook

also has a 10x CD-ROM drive that sits at the front right-hand side of the unit and can be interchanged with a second battery or hard disk drive.

When we have looked at Texas Instruments notebooks in the past, we have always praised the screen quality, but this time we cannot pay the same compliment. The 12.1in active matrix TFT screen lacked the sharpness we were accustomed to and, compared with the other notebooks in this review, the difference was noticeable. The lithium ion battery lasted just one hour and 55 minutes.

At 3.7kg, the TravelMate was one of the lighter machines and comes with a leather carry case. The machine has both Windows 95 and WFW 3.11. You select the operating system on first boot and the unselected one is automatically deleted. A three-year warranty wraps up this offering from Texas Instruments, now distributed in Australia by Acer Computer. However,

Acer's own contribution to this review proved a better overall performer and cost almost \$2,000 less.

Roulla Yiacoumi

- **Distributor** Acer Computer
- **Phone** (02) 9870 1999
- **Online** <http://www.ti.com>
- **Price** \$9,899
- **In short** A lot of money but not a whole lot to show for it.

Tecra 740 CDT

TOSHIBA

If a good, large screen is your first priority in a notebook, then the Tecra is an attractive choice. Its active matrix TFT 13.3in screen is clear and bright, and the largest available on the market — for the present, anyway.

The Tecra was the most expensive system APC tested, with an updated version of

BatteryMark (hours:minutes)

Acer AcerNote Nuovo 32/3100	2:54
Digital Hi Note VP 575	2:49
Gateway Solo 9100XL	2:42
Compaq Presario 1082	2:13
IBM ThinkPad 760XD	2:03
Toshiba Tecra 740CDT	2:03
Texas Instruments TravelMate 6160	1:55
Dell Latitude LM M166ST	1:53
NEC Versa 6200	1:46
Sharp PC-9800T	1:46
HP OmniBook 800CT 5/166MMX	1:38
AVERAGE	2:09

WORST BEST

Business Disk WinMark

Acer AcerNote Nuovo 32/3100	887.5
IBM ThinkPad 760XD	753
Gateway Solo 9100XL	727
Digital Hi Note VP 575	710
Dell Latitude LM M166ST	685
NEC Versa 6200	681
Toshiba Tecra 740CDT	668
Texas Instruments TravelMate 6160	663
HP OmniBook 800CT 5/166MMX	637
Sharp PC-9800T	594
Compaq Presario 1082	574.5
AVERAGE	689.1

WORST BEST

Business Graphics WinMark 97

Gateway Solo 9100XL	59.2
Dell Latitude LM M166ST	55
Digital Hi Note VP 575	54.4
Sharp PC-9800T	53.1
HP OmniBook 800CT 5/166MMX	44.8
Acer AcerNote Nuovo 32/3100	44.1
NEC Versa 6200	43.4
Compaq Presario 1082	39
IBM ThinkPad 760XD	35
Texas Instruments TravelMate 6160	31.8
Toshiba Tecra 740CDT	26.2
AVERAGE	44.2

WORST BEST

CD-ROM WinMark 97

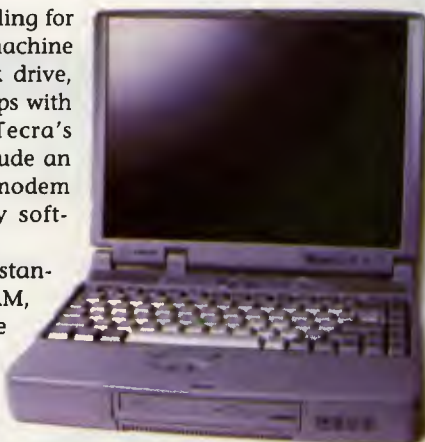
Toshiba Tecra 740CDT (10x)	1,920
Texas Instruments TravelMate 6160 (10x)	1,780
Sharp PC-9800T (10x)	1,630
Acer AcerNote Nuovo 32/3100 (10x)	918
Gateway Solo 9100XL (10x)	916.5
NEC Versa 6200 (10x)	888
Digital Hi Note VP 575 (12x)	795
Compaq Presario 1082 (10x)	791
Dell Latitude LM M166ST (10x)	718
IBM ThinkPad 760XD (8x)	628
HP OmniBook 800CT 5/166MMX	N/A
AVERAGE	1,098.5

WORST BEST

our test unit now selling for \$11,490. (Our test machine had a 2G hard disk drive, but the new unit ships with a 3G drive). The Tecra's hefty price does include an internal 28.8Kbps modem with full telephony software.

The Tecra ships standard with 16M of RAM, so the price we have quoted includes an 'extra' 16M of EDO RAM to beef it up to the required 32M. Power users have the option of extending this to a maximum 144M.

The Tecra's scores hovered around the average result for most tests, but it placed last in the Business Graphics WinMark 97, with its score of 26.2 way below the 44.2 average. The system placed fifth out of the



11 notebooks tested in the Business Winstone 97, scoring just above average with 34.3. In the Business Disk WinMark test, its 2G drive achieved a score of 668. Note that the system now comes standard with a larger 3G drive, which may have improved its score in this and other tests. The system's CPUMark32 test result of 322 was above average (316), placing it in

fifth position. The lithium ion battery lasted just over two hours in our rigorous testing.

The Tecra follows the traditional Toshiba form factor—thick and sturdy. Its large screen could partly explain its 4.4kg weight. The unit has two large internal

speakers, located above the keypad, and uses a Crystal CS4232 soundcard and a 10x CD-ROM drive.

The drive bay accommodates the floppy or the CD-ROM, and if you choose to install the CD-ROM drive, you can access the floppy via an external drive and port. PC Card slots are located by this port, and will take two Type II or one Type III cards. It also includes a parallel port, serial port, PS/2 port, SVGA monitor port and a 240-pin expansion port.

Toshiba provides a great three-year return-to-base warranty.

Selina Mitchell

- **Distributor** Toshiba
- **Phone** 1800 021 100
- **Online** <http://www.toshiba.com>
- **Price** \$11,490
- **In short** Average performance for an above-average price, but the screen is great.

CPUMark32

Sharp PC-9800T	358.5
Digital Hi Note VP 575	348
Gateway Solo 9100XL	348
HP OmniBook 800CT 5/166MMX	344
Toshiba Tecra 740CDT	322
Dell Latitude LM M166ST	321.5
Acer AcerNote Nuovo 32/3100	314
IBM ThinkPad 760XD	313
NEC Versa 6200	311
Texas Instruments TravelMate 6160	250
Compaq Presario 1082	246
AVERAGE	316

WORST

BEST

High End Disk WinMark

Acer AcerNote Nuovo 32/3100	3,040
Gateway Solo 9100XL	2,140
Digital Hi Note VP 575	2,110
IBM ThinkPad 760XD	2,085
NEC Versa 6200	1,990
Dell Latitude LM M166ST	1,970
Toshiba Tecra 740CDT	1,930
Texas Instruments TravelMate 6160	1,810
HP OmniBook 800CT 5/166MMX	1,805
Compaq Presario 1082	1,740
Sharp PC-9800T	1,630
AVERAGE	2,022.7

WORST

BEST

Price

Toshiba Tecra 740CDT	\$11,490
Texas Instruments TravelMate 6160	\$9,899
IBM ThinkPad 760XD	\$9,495
NEC Versa 6200	\$9,225
Digital Hi Note VP 575	\$9,153
Acer AcerNote Nuovo 32/3100	\$7,999
Compaq Presario 1082	\$7,898
Gateway Solo 9100XL	\$7,800
HP OmniBook 800CT 5/166MMX	\$7,776
Sharp PC-9800T	\$7,695
Dell Latitude LM M166ST	\$5,615
AVERAGE	\$8,550

WORST

BEST

Business Winstone 97

Gateway Solo 9100XL	37.2
Digital Hi Note VP 575	37
Dell Latitude LM M166ST	36.2
NEC Versa 6200	35
Toshiba Tecra 740CDT	34.3
Sharp PC-9800T	33.9
Acer AcerNote Nuovo 32/3100	33
IBM ThinkPad 760XD	32.1
HP OmniBook 800CT 5/166MMX	32
Texas Instruments TravelMate 6160	28.7
Compaq Presario 1082	28.6
AVERAGE	33.5

WORST

BEST

Specifications: MMX notebooks

Product	Acer AcerNote Nuovo 32/3100	Compaq Presario 1082	Dell Latitude LM M166ST	Digital Hi Note VP 575	Gateway 2000 Solo 9100XL	HP OmniBook 800CT 5/166MMX
Distributor	Acer Computer	Compaq Computer	Dell Computer	Digital Corporation	Gateway 2000	Hewlett-Packard
Phone	(02) 9870 1999	1800 368 369	1800 808 312	132 393	1800 061 594	131 347
Fax	(02) 9878 6227	(02) 9911 1800	1800 818 341	(02) 9561 7553	(02) 9844 8550	(03) 9898 7831
Web site	http://www.acer.com.au	http://www.compaq.com	http://www.dell.com/intl/apcc/	http://www.pc.digital.com.au	http://gw2k.com.au	http://www.hp.com.au
Price	\$7,999	\$7,898	\$5,615	\$9,153	\$7,800	\$7,776
Processor	Intel Pentium 166MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 166MHz MMX	Intel Pentium 166MHz MMX
Secondary cache (K)	256	256	256	256	256	512
Tested/maximum RAM (M) and type	32/64 EDO	32/48 EDO	40/72 EDO	16/80 EDO	32/192 SDRAM	32/80 EDO
Disk size (G) and type	2.1 EIDE	1.4 EIDE	1.4 EIDE	2.1 EIDE	3 IDE	2.1 EIDE
Video bus type	PCI	PCI	PCI	PCI	PCI	PCI
Video RAM (M) and type	1.1 EDO	1 EDO	1.1 VRAM	1 VRAM	4 EDO VRAM	1.8 EDO
Video controller chip	NeoMagic MagicGraph	NeoMagic 128-bit	NeoMagic 2093	NeoMagic 2093	Chips and Technologies 65554	NeoMagic 1282V
Pointer device	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Pop-out mouse
Dimensions (cm) (H by W by D)	5.5 by 31 by 24	5.3 by 30.8 by 25	5.2 by 29.8 by 22.2	5 by 30 by 22.8	5.6 by 31 by 24.3	4 by 28.1 by 18.6
Weight (kg)	4.3	3.9	3.8	3.6	4.4	2.6
PC Card slots	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Optional docking port available	Yes	Yes	Yes	Yes	Yes	Yes
CD-ROM drive	10x	10x	10x	12x	10x	No
Soundcard	Yes	Yes	Yes	Yes	Yes	Yes
Built-in speakers	Yes	Yes	Yes	Yes	Yes	Yes
Display size (inches) and type	12.1 active matrix TFT	12.1 active matrix TFT	12.1 active matrix TFT	12.1 active matrix TFT	13.3 active matrix TFT	10.4 active matrix TFT
Maximum internal resolution	800 by 600	800 by 600	800 by 600	800 by 600	1,024 by 768	800 by 600
Maximum external resolution	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768
Tested battery life (hours:minutes)	2:54	2:13	1:53	2:49	2:42	1:38
Battery type	Smart lithium ion	Lithium ion	Smart lithium ion	Smart lithium ion	Lithium ion	Lithium ion
Operating system	Windows 95 or Windows NT Workstation	Windows 95	Windows 95	Windows 95	Windows 95	Windows 95 or Windows 3.11

Product	IBM ThinkPad 760XD	NEC Versa 6200	Sharp PC-9800T	Texas Instruments TravelMate 6160	Toshiba Tecra 740CDT
Distributor	IBM	NEC	Sharp	Acer Computer	Toshiba
Phone	132 426	1800 812 796	(02) 9830 4600	(02) 9870 1999	1800 021 100
Fax	(02) 9354 7766	(02) 9930 2175	(02) 9672 1208	(02) 9878 0761	(02) 9979 8193
Web site	http://www.pc.ibm.com/thinkpad	http://nec.com.au	http://www.sharp-usa.com	http://www.acer.com/aac/ti_index.htm	http://www.toshiba.com
Price	\$9,495	\$9,225	\$7,695	\$9,899	\$11,596
Processor	Intel Pentium 166MHz MMX	Intel Pentium 166MHz	Intel Pentium 166MHz MMX	Intel Pentium 166MHz	Intel Pentium 166MHz MMX
Secondary cache (K)	256	256	512	512	256
Tested/maximum RAM (M) and type	31/104 EDO	32/128 EDO	32/64 EDO	32/96 EDO	32/144 EDO
Disk size (G) and type	3 EIDE	2.1 EIDE	2.1 EIDE	2.1 EIDE	2.02
Video bus type	PCI	PCI	PCI	PCI	PCI
Video RAM (M) and type	2 EDO DRAM	2 EDO VRAM	2 EDO	2 EDO	2 EDO
Video controller chip	IBM ThinkPad Cyber PCI	Chips and Technology CT 65550	Trident Cyber 93850	NeoMagic 128-bit	Chips and Technologies
Pointer device	Trackpoint	Touchpad	Touchpad	Trackpoint	Trackpoint
Dimensions (cm) (H by W by D)	5.4 by 29.6 by 21.2	6.2 by 29.6 by 25.8	5.6 by 29.7 by 23.5	5.3 by 30.5 by 22.9	6.2 by 32 by 24
Weight (kg)	4	4.3	4.2	3.7	4.4
PC Card slots	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Optional docking port available	Yes	Yes	Yes	Yes	Yes
CD-ROM drive	8x	10x	10x	10x	10x
Soundcard	Yes	Yes	Yes	Yes	Yes
Built-in speakers	Yes	Yes	Yes	Yes	Yes
Display size (inches) and type	12.1 active matrix TFT	13.3 active matrix TFT	12.1 active matrix TFT	12.1 active matrix TFT	13.3 active matrix TFT
Maximum internal resolution	1,024 by 768	1,024 by 768	800 by 600	800 by 600	1,024 by 768
Maximum external resolution	1,024 by 768	1,024 by 768	1,024 by 768	1,024 by 768	1,280 by 1,024
Tested battery life (hours:minutes)	2:03	1:46	1:46	1:55	2:03
Battery type	Lithium ion	Lithium ion	NiMH	Lithium ion	Lithium ion

Welcome to Workshop, a section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating-system-specific columns and easy-to-follow programming tutorials.

The four sections of Workshop are Tech Talk, Operating Systems, Shareware and Programming. Tech Talk is a general section that covers features; Internet topics; the Technobabble column for beginners; and a new, bimonthly, all-out techie column called Hardcore, where you will find the latest in-depth information on computing technology.

Operating Systems covers the popular Windows 95, OS/2 and Mac OS operating systems, and the Shareware section contains useful or interesting software for each OS.

Programming features two brand-new columns. Developers Corner covers some of the issues involved with designing and developing software, while JavaScript starts a series of tutorials aimed at teaching the essentials of JavaScript programming. HyperText, previously known as Online, continues to cover the ever-diversifying art of Web page programming.

Get involved

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at **apcmag.com**. Here you will also find a new online discussion forum where you can discuss technical issues or hardware problems, or just voice your opinion on any related topic.

Don't forget that Workshop is a reader input section. Feel free to contact us by sending any ideas, comments or criticisms you have. You can email us on **workshop@acp.com.au** or send snail mail to APC Workshop, PO Box 37, Sydney NSW 1028.

Ashton Mills, Workshop editor

Tech Talk

153

The feature piece for this month is written by our own technical editor, Lachlan Botticchio, who talks about chip sets and what they mean for performance. Meanwhile, Technobabble covers the ins and outs of serial ports and modems.

Operating Systems

157

A large collection of useful hints and tips can be found in Windows 95 this month,

while OS/2 Warp reveals ways to improve the look of your OS/2 desktop with bitmaps, icons and fonts. Mac OS takes an informative look at the various scripting languages, such as AppleScript, available on the Mac.

Programming

163

This month the second instalment of Developers Corner covers the hot topic of the 'millennium bug' and how to avoid it. Hypertext reveals how to create lean, mean Web pages with careful use of images and tables, and JavaScript takes a look at errors and how to deal with them.

Shareware

171

Windows Shareware scours the Web for useful, completely free software. OS/2 Shareware examines a range of personal information and time managers, and Mac Shareware takes a look at the powerful Mac-only Internet protocol known as Hotline.

Win! Win! Win!

To complement the new Bug of the Month section of Developers Corner, Workshop is on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, examples of poorly working features or procedures on how to crash a particular application. Anything and everything that is buggy deserves mention. Send us the bug of your choice by August 30, via email or snail mail, and you'll be in the running to win a copy of Microsoft's Visual C++ Version 5.0 Professional. Feel free to send screen captures or example code listings as well as how to duplicate the bug, if applicable.

Winners will be announced in the October edition of APC and the winning bug will appear in the Bug of the Month column. Get cracking!

For conditions of entry, see page 221.



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The chipset that resides on your PC's motherboard can affect many different areas of your system. From the return on investment to performance and upgrade paths, the chipset can be a vital factor when choosing a PC and motherboard. **By Lachlan Botticchio**

Choosing the right chip

A chipset is a group of chips that controls and directs the flow of bits around the computer. Your regular chipset provides the interface for your IDE disk drives, COM ports, memory and other standard computer functions.

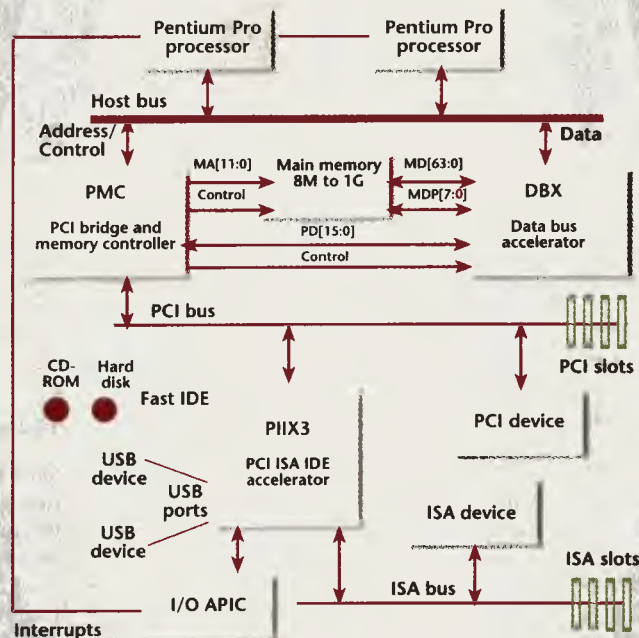
Chipsets come in different models that support varying levels of technology. The difference in chipsets will determine such things as how much and what type of memory you can use, what type of interfaces you can use, and more importantly, how efficiently it manages these subsystems. As any die-hard performance junkie will tell you, the key to an efficient system is a motherboard with the right chipset.

Before the introduction of the Pentium there were many companies that developed chipsets for 386 and 486 motherboards. During the early years of the first Pentium processors, Intel released the first of the Triton chipsets — the 430FX. This chipset became very popular because it was made by Intel, the same company that made a large portion of processors on the market, and provided features that no-one else could match. Since then most of the other chipset manufacturers have given up or moved on. Intel now provides chipsets for 80% or more of the world's motherboards. Only three companies are still trying to compete seriously with Intel for chipsets — AMD, VIA and SiS.

The word from Intel

Intel has cornered the chipset market. Ever since the release of the Triton 1 (430FX) chipset, Intel has been the dominant player in the chipset market. If you look at the comparison table you can see how the

Structure of the 440FX chipset



modern chipsets from the different vendors compare with each other. The 430FX was the first of the modern Pentium (socket 7) chipsets and supported a moderate set of features.

The FX's successor was the 430HX chipset. This was the first chipset to really put distance between Intel and its competition. The 430HX fully supported EDO and BEDO DRAM, could cache all of the memory possible on the board (512M) and was one of the first to provide connectivity for the Universal Serial Bus. The HX is still one of the best-performing non-SDRAM-capable chipsets on the market today.

After the HX, Intel released the 430VX, marketed for the home-computer market. The main feature of the VX chipset over

the HX is that it was the first chipset to support SDRAM, the current state-of-the-art memory technology in the PC industry. The VX also had better EDO timing, allowing faster memory access than the HX could achieve.

Because the VX was designed with the home consumer in mind, certain shortcuts were taken. The VX could only support up to 128M of memory and only 64M of that can be cached. Intel also didn't bother with ECC memory support on the VX, as such capabilities are only desired in servers. With one product for the workstation and server market (430HX) and another for the home user (430VX), Intel was covering all bets.

By the beginning of this year, Intel had a number of technologies and industry standards up its sleeve and it needed a PCI chipset that could deliver them to the public. Early this year Intel answered with

the 430TX chipset. The TX was designed with the release of Intel's MMX processors in mind. Apart from improved SDRAM support, the new Ultra DMA IDE interface, advanced power management in the form of Intel's Dynamic Power Management Architecture (DPMA) and all the features that came with the VX, the 430TX chipset is also suited for use in mobile computers. Traditionally, notebook manufacturers have used proprietary and custom chipsets in notebook computers to suit current needs.

Other players

There was a time, before Intel crashed the chipset party, when alternative chipset

Pentium based (Socket 7) Chipsets

Chipset model	Intel 430HX	Intel 430VX	Intel 430TX	AMD 640	VIA Apollo VP3NR	VIA Apollo VP2/97	VIA Apollo VPX/97	SiS Chip Set Si55581, Si55582	SiS 5591
Processor and memory									
Dual processing support	Yes	No	No	*	*	Yes	Yes	*	No
Max memory size	512M	128M	256M	512M	1,024M	512M	512M	*	384M
Memory types supported FPM/EDO/	FPM/EDO	FPM/EDO/	FPM/EDO/	FPM/EDO/	FPM/EDO/	FPM/EDO/	FPM/EDO/	FPM/EDO/	
		SDRAM	SDRAM	SDRAM	SDRAM	SDRAM	SDRAM	SDRAM	SDRAM
ECC/Parity	Yes	No	No	Yes	Yes	Yes	No	*	No
L2 cache									
Max amount of cache	512K	512K	512K	2M	*	2M	2M	*	1M
Max amount of main memory cacheable	512M	64M	64M	*	*	*	*	*	*
PCI									
PCI support	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Concurrent PCI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Southbridge features									
USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IDE type onboard DMA	Bus Master IDE	Bus Master IDE	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra
AGP	No	No	No	No	Yes (66MHz and 133MHz)	No	No	No	Yes
Power management	N/A	N/A	ACPI	ACPI	ACPI	ACPI	ACPI	ACPI	ACPI

*Not specified — Information had not been released from the company at the time of writing.

vendors were numerous. Companies such as OPTI, VLSI, SiS and VIA had their chipset solutions on motherboards of all shapes and sizes.

Only recently have we seen the return of any form of competition. US company VIA Technology has been making chipsets since the days of the 486. VIA has recently released details of its new Pentium chipset, the VP3, which includes AGP support. VIA chipsets have started appearing on motherboards from companies such as FIC.

SiS is another chipset player that has been around since the early days of desktop PCs. SiS is the largest fabless semiconductor company in Taiwan. Until recently, it has failed to gain back any significant market share from Intel in the chipset arena. SiS

has recently announced new chipsets that are technologically more advanced than Intel's current offering, and at the Computex PC show in Taiwan this year it was announced that SiS chipsets will shortly be appearing in brand-name motherboards from companies such as ABIT.

Pentium Pro and Pentium II

Currently the only chipset to be found running Pentium Pro and Pentium II systems is the Intel Natoma 440FX. This product is becoming out dated, as it doesn't support the newer I/O technologies such as Ultra DMA, ACPI, SDRAM and AGP. Intel's older 440GX chipset is the only one available that will support more than two processors

at one time and is found in all of the modern superservers. Both SiS and VIA have Pentium II (Slot 1) chipsets available that are technically superior (see comparison table) to Intel's 440FX and we hope to see them on motherboards very soon.

Down the track

SiS and VIA already have advanced products with AGP ready to go, motherboards with AGP should be ready by the end of this year. Intel, as usual, is keeping quiet about chipsets that it has on the cards, but rumours abound. Although it is still not officially announced, Intel has its 440LX Pentium II AGP chipset in the pipeline. It will probably be ready towards the end of this year, and will provide the Pentium II with a real performance improvement.

The 'next big thing' in chipset design and technology will be defined by the release of Intel's Merced processor. This is the chip that Intel has been jointly developing with Hewlett-Packard, and all kinds of wondrous technological innovations are promised. The Merced has been rumoured to run externally at 100MHz, so it will need a chipset to support it. No doubt we will also have MMX2 and other new performance-enriching technologies. AMD, which has only recently entered the chipset game, licensing the VP-2 product from VIA to help get support for its K6 processor, wants to extend the socket-7 specification to 100MHz bus speed as well.■

Pentium II class (slot 1) chipsets

Chipset model	Intel 440FX	SiS 5602	VIA Apollo V6
Processor and Memory			
Dual processing support	Yes (APIC)	Yes	Yes (APIC)
Max memory size	1,024M	512M	1,024M
Memory types supported	EDO/FPM/BEDO	FPM/EDO/BEDO/SDRAM	EDO/FPM/BEDO/SDRAM
ECC/Parity	Yes	Yes	Yes
PCI			
PCI support	2.1	2.1	2.1
Concurrent PCI	Yes	Yes	Yes
Southbridge features			
USB	Yes	Yes	Yes
IDE type onboard	EIDE Mode 4	Ultra DMA	Ultra DMA
AGP	No	No	No
Power management	SMM	ACPI	ACPI

Ever wondered why modems squeal when connecting? Think it strange that they should need to shake hands? There's more to this modem business than first meets the eye. By Nathan Taylor

Technobabble

You probably already know what a modem is. In fact, if our editor is to be believed, you (along with 95% of APC readers) already have one and are using it to connect to the Internet on a regular basis. From the annoying squeals it makes when you make a call, and the fact that you have to connect it to a phone line, it's fairly obvious that the modem uses noises to transmit data to other modems over the phone network. The task of the modem is just that — to modulate and demodulate (hence the name: MODulate/DEModulate) data signals so they can be sent over standard phone lines.

Unfortunately, the phone network is not always the perfect place to transmit data. Modems have to deal with the same squeaks, whistles, pops, crossed lines and static as users of the public phone network.

The phone network

To begin with, let's take a look at the structure of the plain old telephone system (POTS). To understand how modems work, we have to understand that the phone network was set up for voice communications, and that this remains its primary purpose (and the source of most of the telecommunications carriers' income). The network engineers who set it up found that they could save a lot of money and reduce congestion by limiting transmission to human voice frequencies; sounds outside these frequencies (such as that produced by a dog whistle) simply cannot be transmitted over standard phone lines, limiting the range in which modems can transmit data. The actual range possible varies from country to country, but the general range (according to the Bellcore standard) is about 150 hertz (Hz) to six kilohertz (KHz).

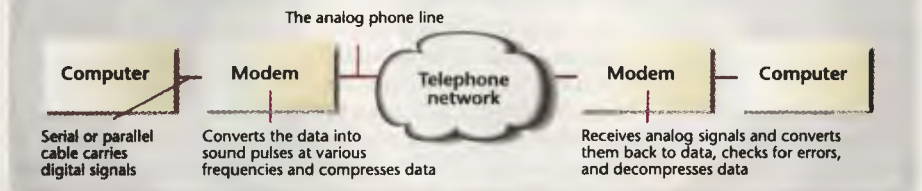
The cleanest line conditions occur in the 1.5KHz to 3KHz range, and this is the range in which modems will work the best. You will probably have noticed that most interference on the phone lines occurs at either high (static, hisses) or low (hums and clicks) pitches, and it is these noises that cause the most problems for modems.

A recent invention, the so-called 56Kbps modem, has been designed to take advantage of the widespread implementation of digital exchanges in the phone network. Typically, a modern phone network (including the Australian network) consists of a mix of analog and digital segments, and the latter provide cleaner signals. By keeping the transmission to the digital seg-

allowed the modems to talk to each other simultaneously. The first modems transmitted data at around 300bps; enough for text transfer but little else.

To make the jump from 300bps to 2,400bps, modem manufacturers simply shortened the length of the pulses, so 2,400 could be sent in one second rather than 300. At more than 2,400 pulses per

Modem communication



ments of the phone network as much as possible, and avoiding frequent conversion between analog and digital signals, a number of modem companies have found that they can achieve higher speeds than are possible with the fastest V.34 modems.

The workings of a modem

Upon connecting, modems start talking by transmitting a *guard tone*, similar to the one used by a fax machine, to indicate that it is a modem on the other end of the line. After this the modems test the line conditions at various frequencies, then each sends a continuous tone called an *unmodulated carrier*, which remains up for the duration of the connection. The pitch of this carrier determines the speed at which the modems will attempt to communicate. If at any point this carrier is broken, then the connection is lost. The modems are now ready to transmit data. This entire process is called the *handshake*.

To send data, the first commercially available modems used four frequencies: originate 0, originate 1, receive 0 and receive 1. A pulse on originate 0, for instance, would indicate a value of 0 to the receiving modem, and by varying between originate 0 and originate 1, a string of binary digits could be sent. Having separate frequencies for originate and receive

send, they ran into a new problem. The changes in frequency occurred so fast that they were becoming indistinguishable on the phone lines, and the receiving modem could not distinguish between tones.

The next step was from 2,400bps to 9,600bps. Instead of trying to shorten the pulse length, modem developers used more frequencies. As you might expect, 9,600bps modems use four times the number of frequencies used by 2,400bps modems. Later, 14.4Kbps modems (which used six times the number of frequencies) were introduced, followed by 28.8Kbps (12) and 33.6Kbps (14). At this point the number of available frequencies has pretty much run out, and many of those that are used are in the 'danger zones': the high and low frequency zones in which the phone lines are most susceptible to interference.

This is why you don't always get the full speed of the modem. During the initialisation process (when the two modems first connect), the modem will test the line conditions and see which frequencies it can safely run at. Some frequencies may be rejected because of line noise, resulting in a lower-than-expected transfer rate. It's not unusual to see 28.8Kbps modems connect at 26.4, 24, or even 21.6Kbps because of poor line conditions. When line conditions change during the course of a call, the modems

may also be required to retrain, causing a delay in data transfer.

Of course, even with these precautions, errors still occur. This is where parity checks come in. Parity checks are a simple way of detecting errors in a sequence of bits. An extra bit is added onto the end of a sequence of bits in an attempt to balance out the sequence to make it either an odd number or an even number (described as odd or even parity). If, using even parity, a sequence of 0111011 (which has an odd number of ones) were sent, then the parity bit would have to be a one, to make the complete set even. If it were a zero, then the receiving modem would know that there was a problem and would request a retransmission.

Unfortunately, at high speeds, parity checks cannot pick up all the errors that are likely to occur, so error correction has also been implemented in modems. Error correction takes various forms, such as *checksums* (mathematical principals used to broadly define the contents of a block of data) to test the integrity of data, and *Synchronised Clocks* which carefully meter the transmission of data. Error-correction methods are usually referred to with an MNP figure, such as MNP-4 or MNP-5.

Modem speeds

There are a number of ways to measure the speed at which a modem operates. The most common is bits per second (bps), which is a simple measurement of the number of bits transferred by the modem. Less commonly used now is *baud*, which people often confuse with bits per second. Baud refers to the number of tonal changes per second. Each tonal change indicates the value of a bit, so the baud rate is often referred to as a bit. However, modern modems use more than one frequency set, so while the baud rate has not increased (the maximum is still 2,400), the bit rate has increased as more frequencies are being used.

A more accurate measurement of modem speed is characters per second (cps). Modems tend to be chatty: a lot of the bits sent over the line take care of getting timings right and watching for errors, and for the end user this does not translate into useful information. A measurement of characters per second tells the end user how many usable bits of information are sent across the modem, expressed in terms of ASCII characters (letters and numbers).

You might often notice that when a modem connects it will report speeds vastly different from what you might

expect — for instance, 57,600bps or 115,200bps. This means that the modem is not reporting the actual line speed, but the data terminal equipment (DTE) speed. This is the speed at which the modem talks to the computer that it is connected to, through the serial port. Most current computers can send data to or receive data from the modem at 115,200bps.

This figure is significant, because most modems use compression, which can up

When the ITU chose to go with what became known as V.34, owners of V.Fast modems were left out in the cold.

the effective data rate to four or even eight times the physical line speed. A modem can squeeze 115,200bps or more worth of data into a 33.6Kbps line by removing data redundancies and compressing files in much the same way that programs like PKZip compress files. Different file types will have different compression ratios. The compression and decompression happens at the actual modem, so the extra speed between modem and computer is required to handle all the extra data.

Controlling the modem

Modems are controlled using what is called the AT (for ATtention) command set or Hayes-compatible command set (the latter term is used less often, particularly by modem manufacturers who resent the use of the Hayes branding). When talking to the modem through a terminal emulation program (which sends characters through the serial port to the modem), the user can issue AT commands to set the parameters of the modem's operation. For instance, you can use an AT command to set the number of times the phone rings before an answering modem picks up, or force a certain connect speed, or turn the modem speaker on or off.

While certain AT commands are consistent across modems, a few of the less-used commands can differ between brands. Fortunately, most modems come with a manual describing all the AT commands and their functions.

Speaking of standards . . .

Buying a modem that talks to other modems easily is not always easy. The International Telecommunication Union (ITU), which is responsible for outlining standards when it comes to telecommuni-

cations, takes a long time to grind out official standards, and developers of modem technology often cannot wait until the ITU gets around to considering their application before they release a product. Numerous products in the past have been made redundant when the ITU announced a conflicting standard. V.Fast modems are probably the best-known case.

Before the V.34 standard was ratified by the ITU, Rockwell Semiconductor (the

world's leading manufacturer of modem chips) released V.Fast, its version of V.34. Like V.34, V.Fast operated at 28.8Kbps, but the two types of modems could not communicate with each other except through V.32 (the 19.2Kbps standard, which was the fastest standard ratified by the ITU.) When the ITU chose to go with what became known as V.34, owners of V.Fast modems were left out in the cold. Many current Rockwell-based modems actually support both V.34 and V.Fast, however, so they should not have problems talking to both types of modems at full speed.

A similar battle is raging at the moment regarding the proposed standard for 56Kbps modems. Modems based on incompatible standards from Rockwell and US Robotics are already on sale, and the ITU is quite some distance from making a decision as to which standard will become the standard. Until it does, owners of 56Kbps modems will have to put up with the fact that they may not be able to get the full 56Kbps from their ISP if the ISP does not support the standard their modem uses.

Those lucky enough to have modems that are flash upgradable may be saved from the cost of buying a new modem, however. All modems have some internal software which controls the functions of the modem, such as the frequency of sound pulses and the algorithms used for compression. This software is stored in read-only memory (ROM) inside the modem. For the majority of modems, this is fixed and can never be changed, but for those modems with what is called 'flash' memory, the software can be updated if required. For holders of modems with flash memory, converting a modem to the ITU standard when it becomes available should not be a problem.■

Tips and tweaks for mastering Explorer, customising start-up screens, installing OSR2 directly over Windows 95 and more. By David Flynn

Windows 95

Explore from anywhere

By default the Windows 95 Explorer opens at the root directory of the hard disk on which Windows 95 is installed. That's fine if you want to work on a file that lives in C:\, but otherwise it's a tedious journey of click-scroll-clicking through folders.

Here's a way to create shortcuts that tell Explorer where to go. Begin by examining the Windows Explorer shortcut in the Windows\Start menu\Programs folder. Right-click the shortcut and select Properties, then click the Shortcut tab. The command line or 'Target' is:

```
C:\WINDOWS\EXPLORER.EXE /n,/e,c:\
```

The first part of this command calls the application itself. The '/n' switch forces the Explorer to load as a new window; '/e' instructs it to run in 'explorer' mode with dual tree-file panes, as opposed to the sin-

If you want to open the directory in a standard folder window, remove the 'e' switch from the Target line.

You can force Explorer to show a full but unexpanded tree of all drives, desktop-level folders and system-level devices by changing the Target line to read:

```
C:\WINDOWS\EXPLORER.EXE /n,/e,/select ,c:\
```

where 'c:\' is the drive to have the initial focus.

You can change the icon by clicking the Change Icon button on the shortcut's Properties dialog.

You can place customised Explorer icons anywhere that makes life easier, such as atop the Start Menu or in the Microsoft Office Shortcut Bar. You can also add the Target command line into a VBA or WordBasic macro in the likes of Word or Excel so that you can access an often-used directory from the application's tool bar.

Opening files in Notepad

TXT files aren't the only types of files you may want to open in Notepad. Many free-ware and shareware releases come with files named README.1ST, README.NOW, FILE_ID.DIZ and even README.DOC, although in this case the DOC extension simply means 'documentation'.

These extensions have no parent application, so Notepad doesn't know how to open them. There are three ways to handle this problem.

The first is to use the View-Options-File Types dialog of Explorer to associate every extension with NOTEPAD.EXE. Not only is this cumbersome, but in the case of the DOC files it severs any link with WordPad or Word.

The second option is to double-click the file and in the subsequent Open With dialog box, and select NOTEPAD.EXE — or click once in the list of applications, then



With just a few changes you can create Explorer shortcuts that instantly take you to any folder.

hit 'Navigator' on your keyboard.

The third and much quicker way is to place a shortcut to Notepad in the Windows\Send To folder, so that Notepad will always appear on the pop-up Send To menu.

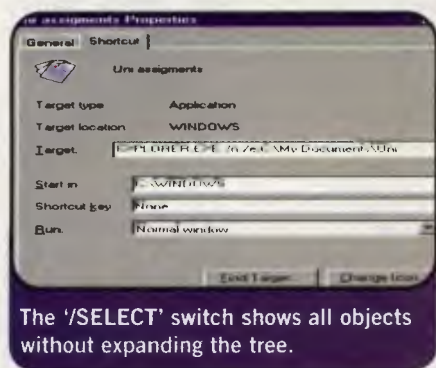
Use icons as cursors

Found an icon file (in the ICO format) that you'd just love to have as a mouse pointer? ICO and CUR files are exactly the same format — a 32-by-32-pixel bitmap — but with a different extension. There's no need to even change the extension to graft that icon onto your mouse. In Control Panel, run the Mouse applet, click the Pointers tab and double-click the pointer you'd like to change. When asked to select the new cursor, drop-down the Files of Type list and select 'All Files', then move to your icon directory and make your choice.

Software, begone!

Some readers have emailed asking how to remove the names of programs that appear in the Control Panel's Add-Remove Programs list. They aren't seeking to remove an application — that's already been accomplished, often by selecting the directory in Explorer and hitting the Delete key.

This is not the recommended strategy for most 32-bit apps, of course: these are



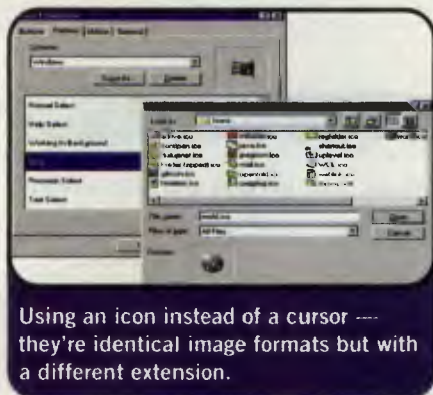
The '/SELECT' switch shows all objects without expanding the tree.

gle window or 'folder' view; and 'C:\' tells Explorer where to start exploring from.

Creating a shortcut with the target:

```
C:\WINDOWS\EXPLORER.EXE /n,/e,C:\My Documents\Uni\Marketing
```

will use Explorer to open the Marketing folder inside the Uni folder inside the My Documents folder on the C: drive.



best removed through the Control Panel, which runs the app's own uninstall routine and in the ideal world will wipe surplus DLLs, clean now-obsolete Registry entries and so on. It also clears the application's name from the Add-Remove Software list.

But if you've already nuked the program at ground zero, how can you eliminate its name from the Add-Remove Programs list?

Fire up Regedit and drill down to the subkey `My Computer\HKEYLOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion`, then open the `Uninstall` folder. This is where the Add-Remove Software usually derives its list. Each program in this folder includes the 'Display-Name' that appears in the Control Panel list and an 'UninstallString' which starts the uninstall routine. Select the folder representing the application whose name you want to remove from the list, then hit the Delete key.

This works most of the time but not always. We've come across some 16-bit programs that append their name to the list but refuse to go away, even when Dr Regedit performs the necessary surgery.

DIY Start Up and Shut Down screens

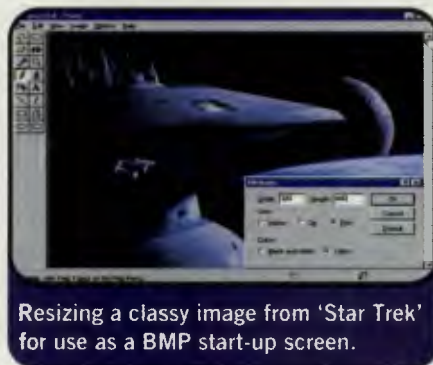
Here's yet another way to add your own stamp to Windows 95. Replace the standard Windows 95 Start Up and Shut Down screens with images of your own choosing — anything from a company logo or your favourite hunk or spunk to that special someone in your life.

Windows 95 allows for three such images, each stored in your `WINDOWS` folder as an `SYS` file. The opening screen of the Windows 95 logo on the 'blue sky with clouds' background is `LOGO.SYS`. The shut-down graphic, which reads "Please wait while your computer shuts down", is `LOGOW.SYS`. The final 'It's

now safe to turn off your computer' image is `LOGOS.SYS`. Despite the `SYS` extension, each file is in fact a bitmap sized to 320 by 400 pixels. By creating a similar-sized bitmap and giving it the appropriate LOGO name, you can employ any image in place of Microsoft's standard issue.

The first step is to save a copy of each original LOGO file with a `BAK` extension so you can return to the original settings at any stage. Be careful when working with these LOGO files, as they have confusingly similar names. Just remember that `LOGO.SYS` is the main logo; the 'W' in `LOGOW.SYS` denotes that you must 'Wait' until the PC can be shut down; and the 'S' in `LOGOS.SYS` stands for 'Shut down'.

Now that you've chosen your new graphics, use a program like PaintShop Pro or LView to convert them into bitmaps if they are GIF or JPEG photo images. Load the image into the Windows 95 Paint application and select `Image, Attributes` from the Menu bar. This shows the size of the image in 'pels' (shorthand for 'pixels'). — it needs to be



320 by 400 pels. You can resize an image by selecting `Image, Stretch and Skew` and by changing the Horizontal and Vertical values in the Stretch box. Most Windows' wallpaper images that cover the entire screen with a single image are 640 by 480 pels. To make this into a LOGO screen you'll need to reduce the Horizontal stretch figure from 100% to 50% and the Vertical stretch figure from 100% to 83%.

Click OK and select `Image, Attributes`. The image should now be 320 by 399. You can change the Height field to read 400 for a perfect fit. This is acceptable for modifying the image when it's already close to the final size, but if you try reducing a 600-by-480 picture to 320 by 400 by changing the figures in the Attributes dialog, the image will be severely cropped. Save each image with a temporary name such as

`LOGO.BMP`, `LOGOW.BMP` and `LOGOS.BMP`. Now save the new Start Up file in the `WINDOWS` folder with the name `LOGO.SYS` and answer Yes when asked to confirm that you wish to overwrite the existing `LOGO.SYS` file.

The next time you start Windows 95 the new screen will show two changes from the original Start Up screen: the new image will be surrounded by a white border, and the animated scroll at the bottom of the screen won't appear. You can replace the other two screens by saving bitmaps as `LOGOW.SYS` and `LOGOS.SYS`.

Installing OSR2 over Windows 95

OSR2 is the latest version of Windows 95. It's not 'Windows 97', as some people call it; merely the most up-to-date build on a single CD-ROM, so you don't need to carry around a Zip disk full of patches, drivers, add-ons and so on, let alone load them one by one.

The leaner and more space-efficient FAT32 file-allocation table, which resizes clusters from 32K down to a miserly 4K, holds most of the appeal. The fact that OSR2 is officially restricted to OEMs — for sale with a new PC, hard drive or motherboard but not on its lonesome — has also probably assisted in it becoming such a sought-after item.

The only rough spot is that, unlike plain vanilla Windows 95, OSR2 cannot be installed directly over an existing Windows 95 system. Users must totally wipe their hard drive or start their PC from a boot disk created on another OSR2 system.

Recently, the trick of fooling OSR2 into loading over Windows 95 has come to light, and like all the best sneaks, it's elegantly simple. Copy the contents of your OSR2 CD onto your hard drive to assist in the installation process, click the Start Menu, then choose `Shut Down and Restart in MS-DOS Mode`. Go to your Windows 95 directory, select the file named `WIN.COM` and rename it to `WINCOM.OLD`. If you have a dual-boot system you'll need to repeat this step in your Windows 3.1 directory.

That's all there is to it. Only the presence of `WIN.COM` informs OSR2 that you already have an earlier version of Windows on your PC and halts the Setup process. Now, still at the DOS prompt, change to your OSR2 directory and enter `SETUP.EXE`. You'll need to have your OEM licence at hand, as this is a special serial number that, unlike the usual Windows 95 licences, includes the letters 'OEM' in the string. ■

Tired of the default scheme? Want to improve the look and feel of your desktop? Learn the art of looking good in OS/2. By Ashton Mills

OS/2 Warp



S/2 seems to lag behind Windows significantly, even if OS/2 is considered a more stable and efficient operating system. When it comes to aesthetics, Microsoft has done an admirable job. Who can deny that Windows 95's clean-cut graphics, animated icons and nicely-packaged themes add appeal to the operating system? If nothing else, these touches help users survive arduous hours in front of the PC.

This wasn't lost on IBM when Warp's GUI went under the electronic scalpel of the Warp programmers. However, Warp's graphic enhancements seem, at best, a loose implementation of good intentions. The new 3D effects are there, the new high-colour icons are there, and there's even the presence of sound schemes. But it's all poorly coordinated, forcing together Warp's old GUI and desktop schemes with the new enhancements and additions. All up, it's a little messy — but it doesn't have to be this way. With the help of a few shareware programs and an understanding of Warp 4's desktop and sound schemes, you can make your desktop look just as impressive as your neighbour's Windows 95 machine.

The looks

You can break down the desktop into three main areas that need improvement: the background, the icons and the window colours. Each needs revamping to make your working environment more enticing. Extras such as fonts and folder backgrounds aren't necessities, but they can make your desktop even more appealing.

The background is the biggest, easiest and

most resource-hungry change you can make. Selecting a different background can instantly add a new look to your desktop. The cost will be equal to the size of the picture, so don't go selecting a 4M TIFF file of your favourite movie star. Instead, go for a tileable GIF or solid JPG image, as these are likely to

Next come colours. Open up the System folder and then the mixed colour palette. Make sure you have a colour scheme in mind and start mixing. Don't settle for the default palette; click on a white square, choose 'Edit Colour' and let your artistic tendencies go wild. After you've made four or five horribly clashing colours, you should select a colour you're fond of and make four shades of this colour, ranging from light to dark.

Now comes the fun part: find a victim folder, such as your OS/2 System folder, and start dragging colours across. Note there are many parts of a folder 'window' you can change. Default background, menu bar, window borders, window edges (don't forget these), slider bars, slider bar backgrounds, top-left icon and the title bar — both selected and unselected. And don't

forget the close, minimise and maximise buttons. This is why OS/2 lags behind Windows yet again, for the colours of these buttons can't be changed, it seems. IBM, in its wisdom, has decided the standard 'grey' scheme is the way to go.

You have two options here: see how your colour scheme looks with grey buttons on every folder, or try to make one where they fit in.

You may be wondering why I haven't suggested making all these changes on a new scheme in the Scheme Palette. The palette can be fiddly to use and some areas, such as window edges, can't be changed with the palette, so it's much easier to just make the changes on your desktop, and remember to back up the



My own attempt at a theme (Babylon 5): colours, fonts, icons and background.

be small. You can only use BMP files as backgrounds? Not true; that limitation exists only in Windows. In Warp 4 you can use any Warp-supported image file (including JPGs, GIFs and even TIFFs) as a background, and testing to see if it fits is as easy as dragging the file to the preview window on the Background tab of your desktop Properties.

Assuming you've found a suitable background, no doubt one that you've scoured the Web for, your next step is to find some impressive icons. If you're into making a theme, you'll want your icons, background and sound files to match up. So look for a source of icons and backgrounds (see the 'Getting the goods' at the end of this article for some places to start).



Tip of the Month

For some time now, many OS/2 users have been trying to set up system-wide associations for use with applications. Normally this can be done individually by editing the properties of an object, but what if you want to set a default application for a default file type across your system, both for current objects and future ones?

An undocumented feature of Warp Fixpack 1 is the inclusion of a CMD file to do just that, at least with multimedia files. Located in your \OS2\ directory is a new file called SETDEFV.CMD. You need to execute the script with the application you want to associate, followed by the file type you want associated. The settings are then stored in your \MMOS2\MMCLSSET.INI file and should be called upon when you next double-click your associated file type. Running it without options will bring up a Help screen with a useful example of how to use it.

desktop using the Archive option. If you're happy with your colour scheme, try to remember what you dragged where, then re-drag each colour to each area while holding down the Alt key. This will make your changes system-wide — and permanent.

Now that you have a nice background and a new colour scheme, it's time to jazz up your frequently-used folders. For this task you'll need a variety of tileable backgrounds to use. You'll be surprised at the difference that backgrounded folders make, both visually and resource-wise. However, they too will suck up RAM, so only use them if you feel you can afford to.

Last but not least are fonts. New to Warp 4 is the ability to add TrueType fonts to your font palette. This means any font in Windows can be used in Warp. Simply use the Font Palette, found in the System folder, to add TrueType fonts and then drag or Alt-drag your chosen fonts to any area of a window or settings notebook.

The sound

Yes, at last you're not stuck with one sound set! Warp 4 comes with four themes that don't seem to be expandable. It's nice to have a choice, albeit limited to four, but surely IBM could have foreseen a way to make your own sound themes and perhaps make them distributable. One snappy shareware author did. Sound16, which can be found on this month's **apcmag.cd**, is a wonderful little program that allows you to make your own themes. What's more, you can package these themes and distribute them on the Net.

The extras

You have colours, backgrounds, fonts and sounds. What else do you want? How about some animated mouse pointers à la Windows 95? Yet another excellent free-ware program comes to the rescue — Amptr100. This program not only produces animated pointers, but does so without running any process. No program needs to be running; it simply registers itself with OS/2, and after you reboot, animated pointers are an inbuilt function of OS/2. What's more, you can import pointer files from a variety of formats, including those used by Windows 95.

Finally, more functional programs such as Warp Enhancer and NPSWPS (previously praised in this column) can also add some snazzy Warp-only aesthetic improve-

be used in Warp so, if you find a Windows theme you're just begging to have, you can. Just copy the files across, insert them in the right places, and you have your own OS/2 theme. Of course, this is a time-consuming method that doesn't allow you to package your theme for other OS/2 users (apart from including files with a long list of instructions), but then IBM never intended OS/2 to be a SOHO OS for all seasons.

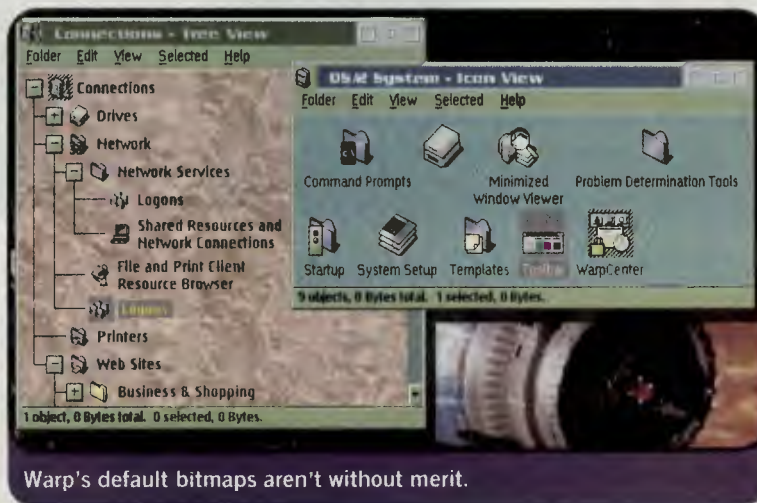
One halfway solution is a commercial product from Stardock Systems, the same company that brought us Object Desktop. The new PlusPak for OS/2 includes a number of rather presentable icon themes. The package also comes with a theme installer and remover. This means you can create your own icon set and save it into one distributable file with Stardock's PlusPak. Other PlusPak users could then download it and install it with one easy click and drag. Although PlusPak doesn't store other desktop attributes such as sounds or window colours, it does store desktop background, folder backgrounds, object positions, view styles and fonts. It even compresses all bitmaps and icons to save space. It's the nearest thing yet to easily-installed, easily-packaged themes for OS/2.

Getting the goods

You can find Warp Enhancer NPSWPS, amptr100.zip and sound16.zip on this month's **apcmag.cd**. A vast selection of icons can be found at the Hobbes OS/2 archive at <http://hobbesnmsu.edu>. Some trendy OS/2-based backgrounds can be found at http://www.os2bbs.com/David_Barne/, while a selection of high-quality, sci-fi-based backgrounds can be browsed at <http://www.world-net.net/user/s/daves/art/index.shtml>.

There are simply hundreds of sites dedicated to tileable backgrounds, most of interest to Web-

page authors, but a good place to start is at <http://206.184.144.121:80/>. For a huge archive of fonts, try pointing your browser at <http://www.ora.com80/homepages/comp.fonts/ifa/index.htm>.



Warp's default bitmaps aren't without merit.

ments, such as folder summaries, warping window animations and folder shadows.

The problem

Any background, icon, animated cursor, font and sound file found on Windows can

Learn to automate your tasks and save time and effort by using scripts and macros. By Stephen Withers

Mac OS



One of the purported benefits of computers is that they reduce drudgery. Word processors let you send a customised letter to many people instead of typing each one individually; spreadsheets can be updated in seconds by adding the latest figures.

But few users take full advantage of the facilities available for reducing repetitive work and condensing multiple actions into a single step. Macro and scripting facilities can save a lot of time and effort, and may be provided within an application or as a system-wide function.

Microsoft Word (6.0 and later) is perhaps the most widely used application with its own scripting language. WordBasic provides access to most features of the program, plus several system-level functions. This is a two-edged sword; it has also allowed the creation of the now endemic Word Macro viruses.

The 'official' approach to scripting under Mac OS is AppleScript, but support for it is uneven. Apple uses three categories: scriptable (controllable by an AppleScript), recordable (capable of creating a script corresponding to a user's actions), and attachable (able to assign a script to a menu or button). I find the 'scriptable' category too broad, and subdivide scriptable applications into those which allow all (or at least all common) operations to be scripted, those which support a modest subset of operations, or those which provide little more than an AppleScript verb to access the program's internal scripting system.

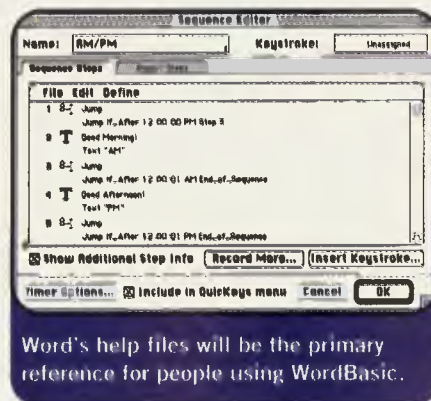
Since AppleScript support is not universal, even in Apple's own software, there is a place for third-party utilities that allow practically any operation to be scripted. The best-known examples are probably QuickKeys, OneClick and KeyQuencer. With very few exceptions, if you can perform an operation with the mouse and/or keyboard, you'll be able to automate it with one of these utilities.

Application scripting

Before you start dabbling with scripting, it's a good idea to make sure you are already making good use of other time-saving features. Why bother creating a macro that

automatically types a form letter for you, when you can create the letter as a template?

A common task is cleaning up a document created by someone who is unaware of typographic niceties such as using em dashes instead of two minus signs and placing one (not two) spaces after a full stop. If you tell Microsoft Word to record a macro while you perform the required set of find-and-replace operations, you'll end up with something like this:



Sub MAIN

```
EditReplace .Find = "—", .Replace = "—",
.Direction = 0, .MatchCase = 0, .WholeWord = 0,
.PatternMatch = 0, .SoundsLike = 0, .ReplaceAll,
.Format = 0, .Wrap = 1
```

```
EditReplace .Find = " ", .Replace = " ",
.Direction = 0, .MatchCase = 0, .WholeWord = 0,
.PatternMatch = 0, .SoundsLike = 0, .ReplaceAll,
.Format = 0, .Wrap = 1
```

```
EditReplace .Find = "(c)", .Replace = "©",
.Direction = 0, .MatchCase = 0, .WholeWord = 0,
.PatternMatch = 0, .SoundsLike = 0, .ReplaceAll,
.Format = 0, .Wrap = 1
```

End Sub

Next time you receive a document with these shortcomings, simply run the macro and Word will automatically clean it up for you. If you find a new change to be made, such as substituting for TM, just add another statement to the macro (you may also need to make sure the trademark symbol isn't in superscript).

WordBasic isn't documented in the Word manual. If you're adventurous and you've done some programming or scripting, the online help is extensive, although

the full story is found in the Microsoft Word Developer's Kit (Microsoft Press).

AppleScript

AppleScript is especially valuable for integrating more than one application, but it shouldn't be ruled out for controlling a single program. Some developers (such as Aladdin) have moved away from proprietary scripting systems to AppleScript, while others use it to link different programs in their range. An example is the way Claris Organizer is able to open a ClarisWorks Office template letter and automatically fill in the recipient's address.

Organizer also uses AppleScripts to create email messages in EMailer and open Web pages with Netscape Navigator, and these scripts can be readily modified to activate alternative programs. For example, the standard script for opening Web pages is:

```
tell application "Claris Organizer 2.0"
    set strURL to Button Field of contact 0
end tell
```

```
tell application "Netscape Navigator 3.0"
    webActivate
    cancel progress
    OpenURL strURL
end tell
```

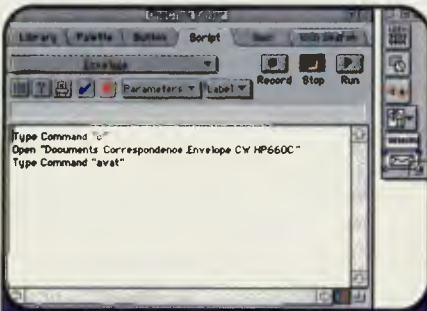
If you prefer Internet Explorer, replace the second "tell" block with:

```
tell application "Internet Explorer 3.01"
    Activate
    OpenURL "http://" & strURL
end tell
```

Even this simple example highlights the fact that applications may use different vocabularies to describe similar actions. Note that MSIE 3.01 generates a faulty URL if the parameter to OpenURL isn't prefixed with "http://".

Things get more interesting when AppleScript is used to collect information from another application. AppleScript can be used in this way to implement CGI's on Mac Web servers, but here's a desktop example. Imagine you often need to specify people's

job titles after their names when preparing reports. The following script lets you select a name in a ClarisWorks document and paste it into Organizer's Find dialog (the paste operation must be done manually). The script then finds the person's title and replaces the selected text in ClarisWorks with the name and title. For example, 'Jeremy White' becomes 'Jeremy White (Editor)'.



OneClick uses conventional structures to build macros, so programmers and experienced scripters will feel at home.

```
tell application "ClarisWorks Office"
    do menu menu item "Copy" of
    menu "Edit"
end tell
```

```
tell application "Claris Organizer 2.0"
    activate
    set thecontact to locate contact
    show contact thecontact
    set thetitle to title of contact 0
end tell
```

```
tell application "ClarisWorks Office"
    activate
    set temp to the clipboard
    set the clipboard to temp & " (" &
    thetitle & ")"
    paste
end tell
```

Note that ClarisWorks' "copy to clipboard" command doesn't work, hence the "do menu" construction; "show contact thecontact" is necessary as "contact 0" is the visible contact; and "set the clipboard" is an AppleScript extension provided by Jon's Commands (available from <http://iw.cts.com/~jonpugh/>).

This is a quick and dirty script with no error checking. It could be given a more elegant user interface (though I find this approach convenient), or modified to retrieve phone numbers, addresses, or other information.

Since few applications are attachable, you'll need a way of activating your scripts

without leaving the application. OSA Menu (<ftp://sunsite.anu.edu.au/pub/mac/umich/util/script/osamenu1.01.sit.hqx>) does an elegant job. It provides a script menu which displays global and application-specific scripts. You can also put scripts in the Apple menu, or activate them via a macro utility (see below) or a menu utility such as Now Utilities' Now Menu.

Don't overlook the potential for AppleScript to save time when using a single piece of software. For example, connecting to the Internet with Open Transport/TCP and Open Transport/PPP involves opening the PPP control panel and clicking the Connect button. When you've finished, you reactivate the control panel, disconnect and close it — a total of five actions. This can be reduced to two actions with a pair of one-line scripts. The "PPP Connect" script is as simple as its name:

PPP connect

and "PPP Disconnect" similarly requires:

PPP disconnect

Save these scripts as applications in the Apple Menu Items folder and you can connect or disconnect with a single action.

Macro utilities

I used CE Software's QuickKeys (distributed by Conexus, [02] 9975 2799) for several years, but more recently I've switched to WestCode's OneClick (Trio Technology, [07] 5538 4555). They're both good products, so use whichever is on hand or suits the way you look at the world. If you'd prefer something from the shareware realm, KeyQuencer Lite (<http://www.binarysoft.com/kqmac/kqmac.html>) has many fans.

The major advantage of macro utilities is that they work with practically any application or control panel whether it supports AppleScript or some internal scripting system.

For example, the Open Transport TCP/IP control panel isn't scriptable, so I wrote a pair of OneClick scripts to switch between configurations. The only difference between the two is the line which uses a Type statement to select the required configuration from the list.

Variable breakticks

Open (FindFolder "ctrl") & "TCP/IP"

breakticks = Ticks + 600

While (NOT (Window("TCP/IP*").Front)) OR (breakticks > Ticks)

End While

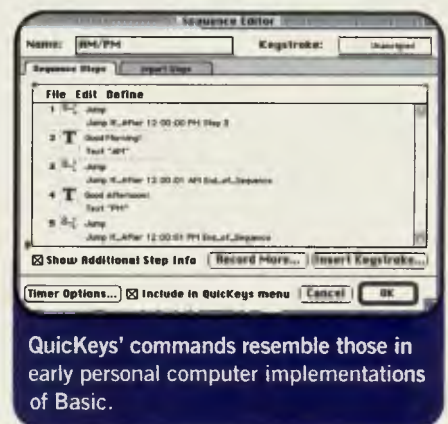
```
If (Window("TCP/IP*").Front)
    Type Command "k"
    Type "OzEmail"
    SelectButton "Make Active"
    SelectMenu "File", "Quit"
End If
```

End If

This example highlights something that isn't immediately obvious to the beginning scripter. When you manually control a program, you automatically wait for the program to catch up with you. Scripts, however, plough on regardless. Accordingly, this script opens the control panel and then waits up to 10 seconds (600 ticks) for its window to come to the front. If the TCP/IP window is then the frontmost, the script activates the required configuration and closes the control panel.

Most of my function keys have a couple of macros assigned to them. Since I spend most of my time writing, several of them are simple keyboard macros that expand a keystroke into the QuarkXPress tags used by APC (making them accessible in any word processor I happen to use). Others include the TCP/IP configuration scripts described above, selecting 8 or 24-bit colour, and launching Organizer.

Another keyboard macro I've found



QuickKeys' commands resemble those in early personal computer implementations of Basic.

handy over the years is one that types the date in YY/MM/DD format. I use this to append the date to the filename when I save a letter or fax, so viewing the folder by name arranges correspondence to a particular person or organisation in chronological order.

As I mentioned earlier, you should make use of facilities provided by your applications before using macros. There's no point in, say, creating an email signature macro if your email program will automatically add your signature. But if you use multiple signatures it might be easier to use a set of macros.■

In this second instalment of our JavaScript column we examine variables and errors, and how to deal with them. By Travis Simon

JavaScript

Understanding variables is fundamental to programming in any language. A variable is simply a named portion of memory, used to hold information, and is roughly analogous to a folder that can hold a single item. For example, if you were writing a program to add two numbers together and display the result you would need somewhere to store the two numbers that the user supplied. In English, the process would be something like this: ask the user for the first number. Store the first number in a variable called 'x'. Ask the user for the second number. Store the second number in a variable called 'y'. Add the two values together and store the sum in a variable called 'result'. Display the phrase, 'x + y = result'.

However, variables hold more than just numeric values. Any information that needs to be tracked throughout the lifetime of a program is stored in a variable. JavaScript has a number of different types of variables including numbers, strings, Boolean values, and a special value known as 'null'.

Numbers include two different types of values — integers and floating point values. An integer is a whole number (no decimal values) that is either positive or negative, and is relatively small. The maximum size of an integer depends on the computer that the program is running on. As a general reference, on a 16-bit machine, it's likely to be around plus or minus 32,000. Floating point values, or floats, usually include a decimal point. Floats can be either plus or minus, and generally hold much larger values than integers. However, floating point numbers use more of the host computer's memory to store.

A string is what might be thought of as text. The phrase 'Hello World!' is a string. A string can include letters, punctuation and even numbers. The number three in the string '3 blind mice' is a character, and not the value 'three', as it would be in the expression $3 + 1 = 4$.

A Boolean variable can only hold one of two different values: true or false. Boolean values get their name from Arthur Boole, who created a type of algebra that was instrumental to the evolution of computers. As you might have guessed, the Boolean algebra revolves around using only two values (1/0, true/false).

Finally, null is a placeholder value that is used to fill a variable when no value is present. An example might be where a program has to search for a value in a list. If the value is found, it places it in the variable. If it is not found, it might place null in the variable. The program can then later determine whether the value was in the list by checking for a null value. The prompt method, which you will learn about later, is used to input information from the user, and if the user presses the cancel button, the method returns null.

JavaScript is what's known as a loosely typed language, which means that a single variable can take on different value types. If you had a variable named 'temp' you could store either a string or numeric value, based upon the needs of the program. Most programming languages require that you declare what type of information you plan to store in a variable before you use it. JavaScript is a little bit less stringent than other languages.

To use a variable, you first have to declare it. Declaring a variable is roughly a statement of intention to use a variable in the program. A variable declaration reserves memory for the variable, and informs the browser that all references to the variable name aren't mistakes. If you forget to declare a variable, the browser will become confused and generate an error message. To declare a variable, simply type the VAR keyword, followed by the name you wish to assign to the variable. Like the rest of JavaScript, variable names are case sensitive. Valid names can begin with either a letter or an underscore, fol-

lowed by letters, underscores, and numbers. To create a variable 'myVariable', you would type:

```
var myVariable;
```

Now that you have variables, you need to put something in them. Singular actions in JavaScript are accomplished using statements. A statement is an instruction to the computer to perform a task. In this case, we want to assign a value to a variable. To do this, we will use the equal operator (=), which assigns the value on the right-hand side to the variable name on the left-hand side. To place the value '5' in 'myVariable', we would type:

```
myVariable = 5;
```

It is important not to confuse this expression with its mathematical meaning. The above statement places five in the variable 'myVariable', and makes no assumptions about the equality of the two values. For example, to increment 'myVariable' by one, we could write:

```
myVariable = myVariable + 1;
```

In this example, the value on the right-hand side of the equals sign (myVariable + 1) is assigned to the left-hand side of the equation (myVariable). Mathematically, the statement makes no sense, but it is one of the most common programming instructions. If we had instead wanted to store a string myVariable, we could have typed:

```
myVariable = "This is a string.";
```

Notice that strings are enclosed in either double or single quotation marks. The sentence above could have been written:

```
myVariable = 'This is a string.';
```

The only stipulation is that you cannot open a string with a single quote and then close it with a double quote, or vice versa.

The following code illustrates the use of variables. The code itself displays two numeric variables on the screen and then adds and multiplies them. The program then displays a friendly message on the screen.

The length of the example is due to the fact that we are displaying a combination of numeric values and strings on the

```
<HTML>
<HEAD>
<TITLE>JavaScript Variable Example</TITLE>
<BODY>
<SCRIPT LANGUAGE = "JavaScript">
<!-- Start JavaScript

var x;
var y;
var result;
var farewell;

x = 5;
y = 7;
farewell = "Thank you, please drive through.";

document.write("The value of x is ");
document.write(x);
document.write(". The value of y is ");
document.write(y);
document.write("<P>");

result = x + y;

document.write("x + y = ");
document.write(result);
document.write("<BR>");

result = x * y;

document.write("x * y = ");
document.write(result);
document.write("<P>");

document.write(farewell);

<!-- end script language -->
</SCRIPT>
</BODY>
</HTML>
```

screen. On line 17, we are displaying a string ("The value of x is "), so we have to enclose that string in quotes. To display the value of x, we have to print the contents of the variable to the screen, and not the letter 'x', so we don't enclose the x in quotation marks (line 18). The docu-

ment.write method writes its argument — either a string enclosed in quotes, or the value of a variable — to the document without adding a carriage return to the end of the line, so lines 17 through to 21 are all printed on the same line. Line 21 writes the string "<P>" to the document. The full stop is printed as the end of the line, and the '<P>' is added to the HTML. <P> is the HTML markup for a new paragraph, so instead of printing to the screen, the next line of text starts a new paragraph. Rounding out the code, the last instruction displays the contents of the variable farewell — the sentence, 'Thank you, please drive through.'

Once again, the code presented is not all that exciting in terms of what it prints to the screen. However, it is the underlying process that is important. After you've entered in the example, change the variable assignments to 'x', 'y', and even 'farewell', and see how it affects the output.

Program errors

The unfortunate reality with programming, in any language, is that you are going to make mistakes. Program errors usually consist of typographic, syntax or run-time errors. Typographic errors are relatively easy to fix, requiring only a retype of the offending phrase. A syntax error is a little more complicated, occurring when you use a command or phrase in a way that it wasn't intended to be used. Sometimes experimentation and a few trials will reveal the correct approach, but at other times you will have to refer back to the language's documentation. The worst errors, at least in terms of correcting, are run-time errors. A run-time error is a flaw in a program's internal logic. For example, a program might input two numbers and then prompt for instructions on whether to add or subtract the numbers. If the program always subtracted the numbers, even

when instructed to add them, the results would be incorrect for each addition request. This example would probably be fairly easy to isolate and correct, but others can be decidedly more complex and more difficult to locate.

The good news is that you're going to

make lots of errors. It is likely that every piece of code you create will contain at least one error. How is that good news? The more errors you receive and fix, the better you will become at correcting them. Errors are annoying at best, and part of the challenge of programming. The other good news is that your browser will report most errors and the line that caused the problems.

Taking a look at the example again; if we take out the first double-quotation mark in the line:

```
document.write("The value of x is ");
```

```
we have,
```

```
document.write(The value of x is ");
```

Loading the page up into a browser presents the error message below. The error message displays the file with the error (C:\APC\JavaScript Column /Examples/Column 2/Variable.htm), the line the error was found on (line 20), the error message (missing) after argument list), and a coloured version of where the error appears.

Notice that the browser does a good job of locating the error, but fudges a bit on what the error is exactly. Actually, the browser is just assuming that everything is okay until it reaches a problem — no closing parenthesis. Because the program encountered a double quote, it assumed that the quotation mark was an opening quote and that the parenthesis was part of the string, and not the end of the argument. The point is that error messages will often *almost* tell you what's wrong. However, with experience in deciphering error messages and more JavaScript knowledge, handling errors will become easy business.

Next month we'll examine program statements and operators, but until then, browse through Gamelan's site (<http://gamelan.com>) to see a few examples of JavaScript in action.■



Everybody's heard about the Millennium bug. What can be done to circumvent this doomsday problem? **By Michael Smith**

Developers Corner

If you are involved in the computer industry, chances are that you have discussed the 'millennium bug' in the last week. It's the topic on everyone's mind today. Guesstimates of the impact of Y2K, as many developers call it, range from 'almost nothing' to 'the end of civilisation as we know it'. The worst-case scenario is pretty scary. It's bad enough to contemplate the collapse of bank systems (no credit cards) and government departments (no social security), but what if all the embedded systems fail — lift and air conditioning controllers, traffic lights, even your home video. Maybe none of these will fail, but the lack of information makes many people nervous.

Will it hit you? Very likely. Don't be misled by the myth that only mainframe Cobol will be affected. If you haven't audited your software you may be heading for a big fall. This is not like any other software project: if your latest upgrade runs late you may lose a few sales, but if your Y2K fixes are not in place you may have to stop trading in January 2000. This adds a little pressure to the equation. Many analysts are predicting a severe shortage of skilled personnel in the final rush to complete Y2K software modifications. This is great news if you are a contract programmer, but a disaster if you are managing a Y2K project.

The nuts and bolts

Exactly what is the millennium bug? Some software represents the year component of a date as a number between zero and 99. For example, 97 would be 1997. In the year 2000 this will represent the date as zero. This may cause date comparisons and other operations to fail, making the software behave unpredictably. A good practical example of this can be seen in credit cards. Many cards have expiry dates set three years ahead. A card issued in August 1997 may have an expiry date of 08/00. Hundreds of complaints have been reported to US banks where systems have compared expiry

date (00) to current date (97) and rejected the card as having expired 97 years ago. Cardholders who are being denied service are understandably upset. This gets even worse if you have a two-digit year field in a multi-gigabyte database. As well as software updates, you need to modify the database, possibly with little or no downtime permissible.

Dealing with databases: cloning

So what *do* you do if you have a multi-gigabyte database with dates stored using a two-digit year? The simplest and most thorough solution is to simply modify the database. Copy the database record by record, changing from two-digit year to four-digit. This presents three main problems: storage space, software modifications and downtime.

The storage space problem is fairly obvious. Do you have storage space for two full copies of your database? With disk space getting cheaper every day, this is less of a problem than it was a few years ago. You also have the option of putting the second copy on an external secondary storage device such as a tape drive.

Software modifications can be a headache. If your software expects to read two-digit years, changing your database is likely to cause fireworks. Fortunately, these modifications can be done incrementally. The first step is to create a centralised set of date-handling routines for reading and writing to the database. These routines should all use four-digit years for the interface, even if they initially have to convert these to two-digit years in order to interface with the old version of the database. Incrementally modify all of the program code to use these date routines and to deal with four-digit years. When all of the database access is completely encapsulated you can modify the database and only need minor software modifications.

Downtime can be the biggest problem for certain systems. Converting the database may take hours, or even days for very large systems. Once you begin conversion it is disruptive to have transac-

tions still operating on the database. That's OK if you can close down the system over a long weekend, but for something like a credit-card database this would not be an option. One possibility is to make a complete copy of the database for conversion and to allow transactions on the original database. You must then keep a log of all transactions that occur during the conversion period. Just before the changeover, you update the new database from the transaction log and switch to the new database. You won't achieve zero downtime, but you'll get close.

Packing them in

There will always be systems in which it is simply not possible to duplicate the whole database, and in which modifications must be made *in situ*. Often this can be done with minimal pain. If the date is stored in ASCII or EBCDIC in the format DDMMYY or similar, it is probably occupying six bytes (48 bits) in the database. A single digit can be represented in binary using four bits. Thus a date in the format DDMMYYYY can be represented in four bytes (32 bits). The remaining two bytes can be used to set a flag indicating that the date has been converted. Using this format, which is sometimes known as 'packed decimal', the conversion can be done while the system is live. The software must be modified to use encapsulated date routines that test the conversion flag and interpret the date accordingly. An alternative approach is to replace a 2-byte ASCII or EBCDIC year with a 2-byte binary integer. A 2-byte integer can represent numbers from zero to 65,535. This should carry us beyond the expected life of any current system. I know they said that about 2000, but the year 65,535 should be far enough ahead.

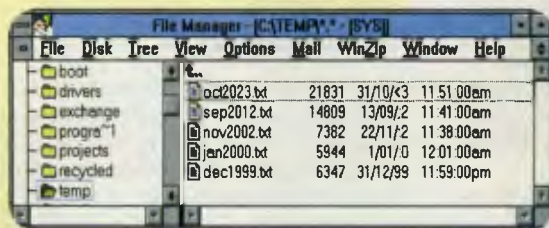
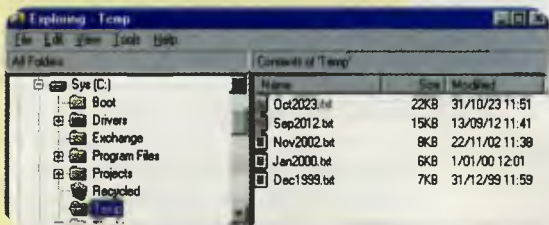
The window solution

Another solution which works well in certain situations is not to fix the database at all. Instead you modify your software to interpret two-digit years as four-digit years.



Bug of the Month

This month's bug features the trusty Windows 3.11 File Manager. Most of Windows 3.11 is Y2K compliant but File Manager lets the side down because it cannot report file dates later than December 31, 1999. Note the different date displays for Windows 95 Explorer and Windows 3.11 File Manager.



A 'fixed window' solution defines a threshold before which dates are invalid. If a date from before the threshold is encountered, you add 100 years to it.

```
IF YEAR IS GREATER THAN 70,
THEN FULL-YEAR = 1900 PLUS YEAR,
ELSE FULL-YEAR = 2000 PLUS YEAR.
```

This works well for a transaction system where you can define a fixed threshold easily, such as the date the system went online.

A 'sliding window' solution is similar, except the threshold is defined relative to the current date.

```
IF YEAR IS GREATER THAN CURRENT-
YEAR MINUS 50,
THEN FULL-YEAR = 1900 PLUS YEAR
ELSE FULL-YEAR = 2000 PLUS YEAR
```

Of course, neither of these systems work where the range of dates to be considered is greater than 100 years. Many systems mistakenly assume that the date of birth may be represented with a two-digit year. While

the number of people aged over 100 are relatively few, they are significant. The present trend towards an increasingly aged society show no signs of changing, so we can expect this to become even more important.

The Holy Grail

The Holy Grail of Y2K programming is the 'magic solution' that will solve the problem quickly and cheaply and save everybody's bacon. Such a solution is unlikely to exist, but any number of tricks are being tried in an attempt to produce it.

One of these, which is surprising in its simplicity, is to simply change the most significant digit to be hexadecimal. This means that the year 2000 will be represented as A0, 2010 as B0 up to 2059 (F9). It doesn't solve the problem, but it relieves the urgency. It's inelegant and temporary, but with time and money running out, it might just save you from disaster.

Code changes: The source problem

A real danger with older systems is the lack of usable source code. Old compilers may no longer be supported and the code may not compile with newer versions. Worse still, the source may have been lost and only object code remain. Third-party libraries are frequently unavailable. In many cases the vendors no longer exist.

Automated tools are available for updating old source. You may be able to purchase software that will convert your old code into a modern dialect. This can save hours.

Some consultants offer 'decompiling'

services to convert object code to source. The process of converting object code into source has been likened to trying to convert a sausage back into a pig: you can try, but what comes out isn't pretty! It's a good last resort, but if you have any choice, avoid it. When looking for old source, don't forget the system backups. You may have old backups hidden away in the machine room. Make sure you consider all of your options.

The virtual haystack

A major reason that companies have been ignoring the problem is that they simply don't know where to start. Medium to large systems may consist of dozens or even hundreds of programs, totalling many millions of lines of code. Some of this code is many years old and very hard to understand. How do you approach the problem? Where do you find the staff and the budget? How do you formulate an action plan? Don't be too surprised if a large number of IT managers take early retirement in 1999.

A burgeoning crop of Y2K consulting firms offer one approach. They provide the expertise, the staff and the tools. They come in, solve your problems and go away. It sounds good until you ask the price. Y2K consulting rates are already exorbitant and will skyrocket as time runs out and demand exceeds supply. However, when you compare the cost of acquiring the expertise and tools yourself you may decide that the consultants are not so bad after all. If you then include the cost of your systems failing in January 2000, they may start to look quite reasonable.

The bottom line is this: whether you convert your systems in-house or bring in consultants, you should have started years ago. If you haven't started yet, sooner is better than later. ■

Path profiling: An unusual approach

Path profiling is an interesting scheme for program analysis that has been proposed by researchers at the University of Wisconsin in the US. Profiling is a common analysis technique for evaluating a program's efficiency. During a run of the program, the amount of time spent executing particular program segments is recorded. Analysis of this is useful for identifying performance bottlenecks.

Path profiling involves recording profile information for each different loop-free path for one or more program runs. A path spectrum can be constructed from this information. By comparing spectrums from runs where the system date is set before January 1, 2000 with runs where the date is set later, different program behaviour can be identified. Program segments that behave differently are prime candidates for further analysis. The paper that discusses this method is available on the Web at <http://www.cs.wisc.edu/wpis/papers/tr1335.ps>.

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Are you wondering why your hits are low? Perhaps your users are tired of waiting for your page to load. This month HyperText tells you how to make a lean, mean Web page. By Lee Borkman

HyperText

What's the most annoying thing about the World Wide Web? Is it rampant commercialism? Is it Bob Carr's face leering out from the NSW Government home page? No, it's even more horrible than that. Snail-pace downloads and grossly overweight pages that waste your time and money are the Web surfer's number one enemy. You know the feeling: you click on a link, the page goes blank, you wait a while, you wait a while longer. Then you hit the Back button and get the hell out of there.

That's no way for a Web developer to make a good first impression. If you want people to visit your site or, better yet, visit it again, then you have to show them something interesting, something informative, something entertaining — really, you just have to show them *anything* before they change their minds and wander off in search of greener pastures.

So how can we make our Web pages leaner and meaner? Well, the two major problems areas are images and tables. I'm certainly not suggesting that images and tables should be completely thrown away, but it's important to use them with care and with understanding.

Everyone knows that images can slow down a page, but you may not be aware of the problem with tables. Have you ever been sitting waiting for a page to appear, watching the lights on your modem flicker, but not seeing any action on the screen? When that happens it's almost certain that the page is laid out using a large table. But why is there a problem with large tables? Tables don't take up any significant bandwidth, so how do they slow down the page?

The trouble is not the bandwidth, but the formatting. Because HTML tables are defined by a series of `<TR>` and `<TD>` tags, a browser cannot know the required number of rows and columns until the closing `</TABLE>` tag is reached. This means that

even when the browser has loaded most of a table's content, it still doesn't know how to *display* the content. For this reason, most browsers just wait until the entire table is loaded before displaying anything at all.

You can help browsers out a little by making sure the size of each cell's content is clearly defined, which basically means that you should include HEIGHT and WIDTH attributes in your `<IMG>` tags. But that won't get around

the problem. It doesn't matter so much if the rest of the page takes a while to load, as long as the surfer has something to look at during the wait.

Troublesome as tables might be, there's no doubt that images are the great bandwidth hogs. Think long and hard before you turn your page into a stunning collage. The idea is to wring the maximum effect from every last byte. Does the image

really need to be that big? Could you get by with a thumbnail alternative? Will anybody stick around for five minutes while your 200K holiday snaps are loading? If the actual dimensions of your images *are* constrained by design and layout considerations, then you can still use a few tricks to minimise the bandwidth. The first rule is simple: *always* specify height and width.

Telling the browser the height and width of your image serves three very useful purposes. First, and most important, it lets the browser allocate the correct space for the image in the page layout before it even begins to load the image itself. This is a huge advantage, especially if your page uses many images and complex

tables. If the browser knows the dimensions of your design elements, then it can begin displaying content almost immediately.

The second reason for using HEIGHT and WIDTH is that you can stretch your images. If, for example, you want your image to display as 200 by 100 you could start with a 150 by 75, which could take half the bandwidth (depending on the image content and format — see below). Specify the display size like this:

```
<IMG SRC=http://server/image.gif
HEIGHT=100 WIDTH=200>
```

This kind of stretching must be done with care. Check the result for unsightly



The line drawing takes much less bandwidth than the photo, and might even look more attractive.

the fundamental problem.

Remember, the vital thing is to ensure that at least *some* content gets displayed as quickly as possible so that the hapless surfer is not left hanging. The easiest way to accomplish this is to put some content outside of the page's main table. If you do need to do spiffy layout tricks at the very top of your page, then you can use another, much smaller table. In most cases, this can be done by simply inserting `</TABLE><TABLE>` between two rows of your table; at other times, it may take some fiddling to get the small table to line up properly with the main table, but the result is well worth the effort. When a surfer begins to load your page, they will be greeted almost instantly by some con-

distortions. You get the best results when the target dimensions are in the same proportion as the original dimensions. Is the loss in resolution acceptable? This technique is especially good for images made up of horizontal and vertical lines.

But that's not all. There is a third reason for using HEIGHT and WIDTH. Sometimes you might actually want to squash your image. No, seriously. Sometimes you want to take a 200 by 100 image and display it as 20 by 10. Why would you want to do that? Wouldn't it be much better to resize the image and reduce bandwidth? Not always. If you have already used the image elsewhere in your page at full size, you can use the HEIGHT and WIDTH attributes to shrink the displayed image for use as an icon, and the browser will use its cached copy without taking any bandwidth at all. As usual, maintain the aspect ratio and check your results.

The tag also has a very handy, under-used attribute called LOWSRC (it's a Netscape extension, so beware), which allows the developer to specify an alternative image to be loaded first. The alternative image is usually a smaller version of the main image, and it will be stretched to fit the HEIGHT and WIDTH specified. You have

the usual problems with resizing, but now it's not so critical, because the LOWSRC image is only a temporary indication of the hi-res picture to follow.

You can get quite adventurous with LOWSRC images. There's no reason why you should limit yourself to providing low-res versions of your main image. All that's really needed is any other image to act as a place-holder. It could be an image of text or some similarly practical information. Try the effects on a good graphics application. You can use edge-detection to turn your photo image into a line drawing. The result can be very attractive, and will probably take significantly less bandwidth. Another possibility is to use a black-and-white version of your image as your LOWSRC.

The more colours used in an image, the larger the image file. If you want 65,536 colours, that takes a whopping 16 bits per pixel, while a black-and-white image uses only one bit per pixel. Now consider your audience. Many surfers out there are only running their displays at 256 colours, so there's probably not much point in using images with 16-bit colour. It's much more efficient to opt for 8-bit, and you end up with more control over the way your images will look.

I mentioned the image file format before. You've heard of JPG and GIF files, but do you know which to use, when and why? The basic rule of thumb is that JPGs are for photographic images, while GIFs are best for computer-generated pictures and line drawings. The major reason is that the GIF format is very efficient at representing essentially blank spaces. Another difference between formats is that interlaced GIFs are well supported by image editors and browsers alike, whereas the progressive JPG is not yet widely accepted. Interlacing is a good way to get content onto your page as quickly as possible. When using JPGs, you can simulate the interlacing with an appropriate LOWSRC image.

No matter how compact you have made your image files, it's still essential to provide a text alternative. For simple images, use the tag's ALT attribute:

```
<IMG SRC=John1.gif ALT="Leadership means never having to say you're sorry">
```

The ALT text serves several functions. First, it is displayed in the image's place while the image is loading, so the impatient user can get some idea of the image content, and get on with surfing. Second, Internet Explorer and Netscape Communicator displays the ALT text in a pop-up window when you point the mouse at an image, like a dynamic caption. Third, the ALT text is used by text-only browsers, or when the user has images turned off. This is particularly important to sight-impaired surfers, who need text for speech synthesis devices.

In the case of image maps, it is even more important to provide a text alternative. It isn't done with a single attribute; you have to actually create a text-only navigation bar. Few things are more depressing than being forced to wait for an image map to load just so you can click on it and go somewhere else.

I've left background images until last, because they are the easiest to mess up, and also the simplest to get right. Don't fall into the trap of using a big squarish image. It's difficult to get the tiling to look smooth, and it wastes bandwidth. Go for an image one or two pixels high, and you can't go wrong. The tiling is perfect, and the bandwidth is negligible.

So there are a few tips for streamlining that bloated page. Grab a handful of graphics packages, and a couple of browsers, and you'll soon have the leanest, meanest site in town. ■



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At a time when more and more shareware programs are either time-limited or significantly crippled, it's nice to find that some useful software is still available for nothing. **By David Nourse**

Windows Shareware

Your Spell

Your Spell is a spell checker for text files, a useful application when you don't want to load a heavy-duty word processor (or don't have one handy). While its dictionaries are modestly sized, it's nice to find a supplementary dictionary for British spellings in this American product.

Spell checking is done in much the same way as the better word processors: the correction window provides suggestions for the correct spelling. A nice touch for the orthographically challenged is an auto-correction feature, which allows you to pair your favourite misspellings with its more conventional renderings.

Your Spell has some very useful configuration options. As with most spell checkers, you can instruct it to ignore words in upper case or that contain numbers. You can also get Your Spell to ignore HTML tags, email addresses and URLs — options I'd like to see in high-end word processors because they'd save a lot of time and bad language.

The dictionary configuration options provide for custom dictionaries, including those created by Microsoft Word (DIC files). In order to speed up word searches you can specify an order of priority for these dictionaries. There's also a good editing facility for adding, changing or deleting words.

If you need the services of a freestanding spell checker, Your Spell should prove a good choice.

■ Publisher	D C Al Coda
■ Price	Freeware
■ Online	http://www.dcalcoda.com/

Super NoteTab 2.4

Super NoteTab (SNT) is one of numerous programs written by frustrated users to replace the annoyingly limited Windows 95 Notepad text-editing applet. It's an

extremely capable text editor that does away with Notepad's biggest weaknesses (32K limit on file size, inability to edit more than one file at a time), and has so many additional features that it's difficult to do them justice in a short review.

The number of files that can be handled by SNT's multiple document interface is restricted only by available Windows resources. Handling several files simultaneously can be a nightmare without a well-designed interface — SNT allows you to move easily between files by stacking them in windows that are accessed by clicking upon tabs at the bottom of the display. Scroll buttons can be used to access off-screen tabs if you've opened more than about 10 files, and a Document Selection window is also available to move between files.

SNT's Clipbook provides a powerful tool for handling text clips, which can be a single special character or a lengthy 'boilerplate' chunk. Clips are stored in templates with a header for identification, and retrieved by selecting the appropriate header from the Clipbook window or by typing the header into your document and hitting a function key — a similar technique to using text macros in word processors. It's a simple matter to define new templates for any kind of text.

The Clipbook normally operates like the Windows Clipboard, overwriting any selected text in your document. Your text clip can include a character code that wraps the new text around the selection — a refinement that is useful in creating HTML pages. Another clever refinement uses character codes within clips to store links to other applications, including Internet links which invoke a specified browser. A sample template containing several 'launchers' is included.

SNT is a very Web-aware program. URLs and other Internet links in any document can be opened in your browser

simply by double-clicking them. The Clipbook includes predefined templates for Internet communications — sets of smilies and common acronyms — and several templates for HTML editing: a set of common tags, a collection of special characters and a set of colour codes. If you're downloading Web pages, there's a useful function for stripping off all HTML tags.

While these features are aimed at Internet users, SNT has a lot to offer anybody looking for a useful text editor, including some features normally confined to word processors. It supports drag-and-drop editing and can perform global search-and-replace operations on all open documents. Property lists are maintained for every document, so text files can preserve a particular font setting. Headers, footers, page numbering and margins can be defined for printing, and document statistics (such as word count) are also available.

Super NoteTab's many useful features are rounded off by nicely-written, comprehensive Help files superior to those provided with many non-gratis applications. Whether you're fed up with Notepad or just looking for a decent text editor, give this program a try.

■ Publisher	Eric Fookes
■ Price	Freeware
■ Online	http://www.unige.ch/sciences/terre/geologie/fookes/

Organic Art, Microsoft Edition 1.20.04

Organic Art was released by Microsoft last year to mark the first anniversary of the release of Windows 95. It's still the mother of all screen savers for Windows 95/NT.

The full-scale version of Organic Art is a high-powered synthesis of art and math-

ematics, a sophisticated graphics application for creating novel images and screen-saver animations sharply rendered in 3D in real time. The 'organic' label describes both the style of the animations and their underlying technology. The program uses software 'genes' — chunks of C++ code atop a powerful graphics engine — which the user mutates to evolve forms ranging from the abstract to the downright visceral.

Microsoft's edition shows off some Organic Art creations, 23 animations ranging from a wildly-animated wave pattern to a group of strange flying creatures dancing in midair above an alien landscape. All display spectacularly fast and detailed 3D rendering, coupled with some fine digital artistry.

You'll need to have Microsoft's Direct3D drivers installed, plus a fair amount of hard drive space. The program is optimised for 16-bit colour displays, although settings ranging from 4

you to choose a playlist from the available scenes. You may need to experiment with some options — for example, 3D hardware support is available but disabled by default because of incompatibility with some graphics cards.

Organic Art makes interesting viewing. It's a software gem that is worth trying even if you don't normally bother with screen savers.

Font-O-Matic 1.04

Font-O-Matic is a simple utility for Windows 95/NT that provides a rapid view of any screen or printer font on your system.

It's very easy to acquire an outsized Fonts folder, and unless you're blessed with a photographic memory, it can be quite a task to find the right font. Font-O-Matic makes life easier by displaying an Explorer-style list of every font.

Selecting a font displays its alphanumeric character set, followed by the immortal sentence 'The quick brown fox jumps over the lazy dog' and the numbers zero to nine in a range of point sizes. Toolbar controls allow you to set character attributes (bold, italic and underlined) for a full preview of the font in action.

There are numerous list options: alphabetical, technology type, function and family. Some of these aren't particularly helpful, because of the numerous fonts that are categorised as 'other' — hard to avoid if there's insufficient information provided in the font files.

Font-O-Matic provides a much faster means of checking out fonts than the Font utility in the Windows Control Panel. I did, however, find myself longing for a Font Delete function whenever I spotted a particularly useless specimen.

This is an unpretentious but useful application, and it's difficult to complain about the price.

Publisher	DeinerSoft
Price	Freeware
Online	http://www.geocities.com/SiliconValley/Park/2247/index.htm

Arachnophilia 2.1

Arachnophilia is a powerful text-based HTML editor which complies with the HTML 3.2 standard and is fully extensible, allowing you to add support for new commands as HTML continues to evolve.

If you don't want to get your hands dirty, Arachnophilia does a good job of

converting Rich Text Format (RTF) documents into HTML pages. As well as preserving font attributes and relative sizes, it's capable of translating bulleted lists, outlines and tables.

You'll still need to do some HTML editing for a really polished page or special effects. Arachnophilia's text-based approach requires a bit more work than a WYSIWYG editor, but it also provides maximum control. Viewing your work is simply a matter of clicking on a button that calls up your favourite browser.

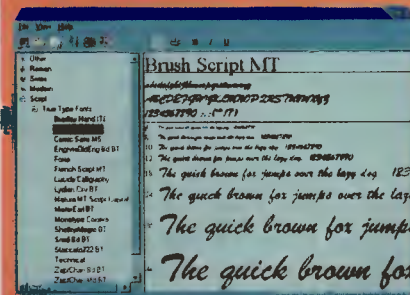
Most of the HTML tags and structures you're likely to need are available, and additional items are easily added. You can use either menu selection or button bars to put HTML elements on your page. A 'metabar' at the bottom of the edit window provides an easy way to bring up the button bars that you require (things become a bit cluttered if you have every bar onscreen at the same time).

Many Web authors seem to have the attitude that it's your bad luck if your browser doesn't support the flashier features of their pages. Arachnophilia gives you an opportunity to fix this through a menu which allows you to use up to six different browsers for previews (provided that you have them installed).

The program's help files are sufficiently detailed to be useful to beginners, and include links to some useful Internet resources. I would like to see one addition — a concise summary of the functions of each of the common HTML tags.

Arachnophilia is a very good product that is well worth trying. It's not strictly freeware: author Paul Lutus has come up with the quixotic concept of 'careware'. He asks that you give some thought to the state of the world and what might be done about it. It's a nice idea.

Publisher	Paul Lutus
Price	A little thought for others
Online	http://www.arachnoid.com/lutus/p/arach.htm



Publisher	Computer Artworks
Price	Free
Online	http://www.artworks.co.uk



to 32-bit colour are available. It works very nicely at 800 by 600 at 16-bit colour and above on faster machines — lower resolutions are available (down to 320 by 200 by 4-bit colour) for slower systems but don't really do it justice.

There are numerous set-up options, including a preview mode which allows

Having trouble managing your time? This month's Shareware covers a diverse range of time-management utilities. By Pradeep Sriganesh

OS/2 Shareware

CRONrgf

Many Unix users will be very familiar with the Cron daemon and now, with CRONrgf, OS/2 users can use it too. Cron is a prompt-driven scheduler that creates or destroys processes and comes with a necessary utility to help new users create 'cronfiles'.

The cronfile dictates when processes should start and end. For those not familiar with Cron and its God-like capabilities, an editor has been provided to ease the pain. But to access the full potential of Cron it is advisable to learn how to construct your own cronfiles.

After a while Cron becomes invaluable for running essential system programs. If your cronfile is configured correctly, your virus checker automatically starts on Friday, backs up on Tuesday, and so on.

Cron saves valuable system resources by executing from an OS/2 shell, having no GUI interface and being written in very efficient REXX code. A number of utilities, such as date conversion, have also been provided to help users along.

■ Publisher	Rony Flatscher
■ Price	Freeware
■ Online	ftp://hobbes.nmsu.edu/pub/os2/util/schedule

Homerun Scheduler 1.02

Homerun Scheduler allows programs to be run or stopped according to a schedule which you design. Homerun is very easy to use and can launch not only OS/2 programs but also DOS and Win-OS/2 programs.

Homerun needs only three settings to make it work: the working directory, when to ask for confirmations, and what your weekdays are. Once set, you're ready to fly. Homerun and its very innovative interface make it very easy to put programs on a schedule. Of course, scheduling OS/2 programs is much easier than it is for DOS or Win-OS/2 programs, where care has to be taken in assigning priorities and other essential

system settings. The documentation suggests scheduling DOS or Win-OS/2 programs a minute or two after other OS/2 programs.

Scheduler contains several options that you won't need most of the time, but it's good to know that they are there. The most useful option in the scheduler is when the program should quit itself. Less useful options include whether the program should start minimised and so on.

Homerun also comes with an appointments book for those busy people who need one. The appointments are kept very much like memos with subject headings, creation date and message. Reminding yourself to watch the 'Simpsons' takes a little longer to configure than you might like, but it does the job nicely. One very important point about the appointments feature is to turn on the alarm, otherwise the appointment goes by with you none the wiser. The alarm can be configured to play a WAV file of your choice, which provides some opportunities for humour.

Homerun comes with a built-in calendar but important dates that are set in the scheduler do not appear in the calendar. Homerun can be invaluable for busy executives who use their computer for everything.

■ Publisher	Crystal Environmental
■ Price	\$US29
■ Online	http://www.musthave.com/h3/clocks.html

Arieel 3.0C

Arieel is a very nice-looking clock that floats on your desktop. If you unintentionally bury it under other applications, it happily pops up in the foreground. Arieel can show lunar phases and calendars, and has a most useful built-in alarm.

Arieel is easy to install and it creates an easy-to-access folder on your desktop. On opening the folder, flags from 26 different nations can be seen. Each flag represents a different time zone and takes into account daylight saving associated

with that country. In the registered version of Arieel, the important dates and holidays of each nation can be loaded into the calendar — very useful for people who travel a lot.

You can also easily change time zones by right-clicking on Arieel and changing the options, making it easy to find out the time in different places.

The alarm is the most useful feature of Arieel but there are only three alarms and they all must be set for the same day.



This is a serious drawback, even if you can have separate WAV files for each alarm. If you have IBMWorks installed from the bonus pack you can use Arieel to set agendas directly in the IBMWorks calendar.

■ Publisher	Andreas Haack
■ Price	\$US15
■ Online	http://www.musthave.com/h3/clocks.html

RoboJob 2.31

A comprehensive job and program scheduler, RoboJob supports all types of programs that can be launched from OS/2, including DOS and Win-OS/2 programs. Unlike Homerun, Robojob doesn't require a lot of tinkering to launch DOS or Win-OS/2 programs.

Entering tasks into RoboJob is very easy. All the important options, such as Create Job and Launch Job, are iconised on the toolbar. Once a job is entered it appears in the job window with a countdown that flashes red when it's ready to start the job. RoboJob can monitor the output of these programs and if necessary initiate other programs. For instance, if I assigned RoboJob to defrag my hard disk, and for some reason this failed, RoboJob would instead initiate a CHKDSK of my drive.

RoboJob's ability to run programs or check the final output of jobs is a very powerful feature. The authors have built on this and allowed REXX programs designed by the user to be run after jobs. This allows users to inform RoboJob of how to react to different exit codes.

RoboJob can be run from the command line to minimise the use of system resources or to facilitate users without a desktop. However, only simple jobs can be executed this way, which means you can't start any DOS or Win-OS/2 programs.

RoboJob can also be used as an appointments book. You can assign important days and holidays so RoboJob can either inform you or run different utilities.

RoboJob also comes with some very powerful utilities. Object Selector allows the running of any program that is on your desktop — any program. Object Selector can read your OS2.INI file and select all the programs and present them to you. This allows you to easily transfer any program from your desktop to RoboJob with all the settings intact.

RoboJob is a very professional and comprehensive package, full of essential and powerful utilities. A must for users who spend a lot of time using OS/2.

- **Publisher** Benno Sauer
- **Price** \$US49
- **Online** ftp://hobbes.nmsu.edu/pub/os2/util/schedule/robo_231.zip

Addressbook 1.6

Addressbook is not just a telephone directory of all your friends and acquaintances, but also a scheduler with a built-in alarm. If you have many acquaintances, it will take a long time to fill out the address book; adding new entries is very tedious.

The address book is organised very much like a Filofax. A field is available to fill in birthdays and Addressbook will remind you when it's time to consider buying a present.

The scheduler can be linked to the

addressbook so the reminder not only reminds you but starts to dial the number straight away. This can be annoying; there is no dialog box to ask you if you want to dial. No programs or jobs can be launched from the scheduler, as they can with Homerun or RoboJob, but the alarm can be set to any time. Unlike Ariee, Addressbook has more than three alarms and they all can use a different WAV file.

A calendar is provided with Addressbook and important dates such as your partner's birthday are all highlighted if you enter in the details. You can also flick ahead a few months to see how busy the month is going to be.

Addressbook can be taxing on system resources, especially if you try to perform a search for a phone number. In the shareware version of Addressbook you can only enter 20 addresses and phone numbers.

- **Publisher** R Falkner
- **Price** \$US25
- **Online** <http://www.os2ss.com/archives/hobbes/os2/apps/addrbk/>

Meal Planner 1.8

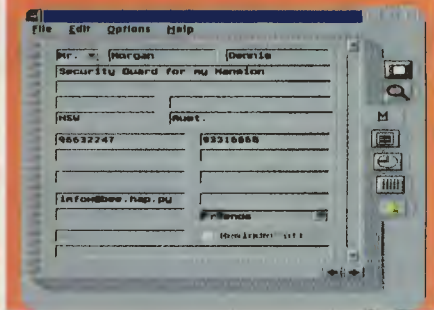
Meal Planner is a program designed to help you plan your meals for the year or for however long you want. The planner calculates fat content, calories and other things associated with food.

Meal Planner is easy to install and set up — just unzip it into a directory and then run it. At first you are presented with a calendar of the month you are in and planning a meal is as simple as clicking on the appropriate day. Unfortunately, you are only allowed the three main meals and two snacks, so five-meal-a-day people such as myself will have trouble using this program. To add a food item to a meal there is a vast menu from which to choose, which can be expanded with your own entries. The author provides a very stable default diet for dinner and lunch in the form of a Big Mac or a Whopper.

Numerous tables are provided to show how many calories you should consume for your age group and your appropriate weight. The documentation does emphasise that this is just a guide and should not be treated as law.

Meal Planner would be ideal for the keen dieter. It can also provide you with invaluable insight into your eating habits. I'm starting to feel fat already.

- **Publisher** Christopher Hodges
- **Price** \$US15
- **Online** <http://www.os2bbs.com/Download/infomgt.html>



- **Publisher** Christopher Hodges
- **Price** \$US15
- **Online** <http://www.os2bbs.com/Download/infomgt.html>

Cal 1.0

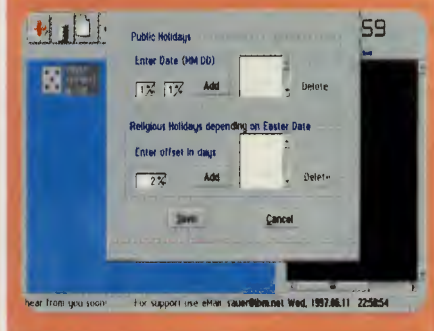
Cal is a port of the famous Unix program of the same name. For people who live and breathe Unix, Cal will be your best friend.

Cal prints out the calendar for the current month or year but can also be used to print out future years and months. This port comes with a manual identical to its Unix counterpart, so don't expect a glamorous searchable Help engine.

Cal is very small and versatile. It doesn't have any fancy alarms or scheduling, but you'll always find a need for it.

- **Publisher** Douglas Clifton
- **Price** Freeware
- **Online** <http://www.unicorn.us.com/cal.html>

- **Publisher** Douglas Clifton
- **Price** Freeware
- **Online** <http://www.unicorn.us.com/cal.html>



We look at a brand-new Internet protocol for the Mac. Hotline, and its range of Mac-only software, is offering a fast alternative to standard Internet protocols. **By Ari Weisz-Koves**

Mac Shareware

Hotline Client 1.1b21r2

Hotline is a revolutionary new Internet protocol developed by Melbourne's Adam Hinkley that is currently only available for Mac OS systems. The Hotline protocol is based on a server that provides chat, personal messaging, news and file transfers.

The Hotline Client provides an elegant interface to the functions available on a connected server through a customisable toolbar on the right-hand side of the screen. This allows the user to select which of the Hotline tools to have open at any point in time. The Options button provides the control panels to set user name, choice of Tracker server, user icon and which events to notify with sounds. The Connect button brings up a dialog box that provides a pull-down menu to access bookmark files, or the ability to enter a server address with log-in information if required.

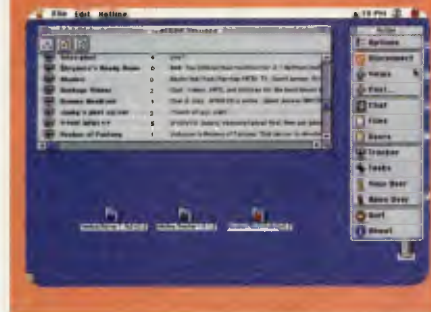
The News button opens a window containing the contents of the news file — a single text file which can be added to by any user with privilege by clicking the Post button. News is often used to notify all users of changed file locations, or most commonly, to remind users to queue their downloads. The Chat button provides a simple chat client which operates on only one channel per server. Servers currently exist to distribute or discuss 3D modelling, games, development, sounds, images and software of all types. Private servers exist, along with chat-only public servers.

The Users window shows all clients currently connected to the server, each with their individual icon, and by selecting a user and clicking a button above, a personal message can be sent.

The Tracker button opens a separate connection to a Tracker server, which provides a list of currently active and registered Hotline servers with descriptions of the motive and accessibility of each server. Clicking on the icon of the desired server negotiates a connection, allowing easy point-and-click navigation of the Hotline world.

Hotline can only connect to one server at a time, and no warnings of disconnection are given, so double-clicking on a

■ Publisher Hotline Software
■ Price \$US25
■ Online <http://www.hotlinesw.com>



server while connected to another will abruptly halt any current file transfers, although File transfers are resumable.

The Files button opens the file transfer window, which has buttons for file information, and for upload and download commands. As in Anarchie, each directory opens a new window, so multiple directories can be viewed at once. Double-clicking a file begins the download, but shift-clicking the file will queue the download, which is considered *de rigueur* among server administrators. Failing to queue the downloads and taking up a large number of the server connections often results in being kicked off or even banned from using a server. Queuing prevents a server from being bogged down by a single user, and results in friendlier transfer rates for all users.

The remainder of the controls in the Hotline Client are used for administration of the Hotline Server through the change of user profiles.

All servers are HFS based, so files are stored and transferred as compressed Macintosh files (Stuffit compression being the standard), which means they are a lot smaller than their BinHex equivalents on FTP servers. Hotline is also much faster than transferring files over FTP or HTTP, so the time required to download a file is substantially reduced. It doesn't take long to adapt to getting full speed out of a modem connection again rather than the crawl-

ing FTP servers. However, the limits that most administrators place on their servers (being desktop Macs rather than Unix servers) means that it can be hard to start downloading a file at all.

Hotline is a refreshing approach to using the Internet that will be appreciated by most users. Waiting to download an application isn't so bad when the topic of conversation on the chat line could be related to specific problems encountered when using it. Since it is still a new protocol, it's still unpopulated, non-commercial and full of geeks and phreaks, the way the Internet was a few years ago.

Hotline is a little difficult to get started on. Without search engines such as those on the Web, the first place to start is a good Tracker, such as tracker.cyberdream.net. This paradise on the Internet for Mac OS users may come to an end soon, as the PC version of Hotline is expected within a few months, but until then, discovering Hotline is like rediscovering the Internet. The client is only 1.2M uncompressed; it runs in 1M of RAM and requires Open Transport networking.

Hotline was developed out of a need for a completely revised approach to Internet protocols. Its stability and speed make it a replacement for IRC and FTP, but it lacks any outlet for creative design, or any audio/visual content to be presented instantly. The Web will still dominate due to its graphical nature, but Hotline surely should be the next home of the Info-Mac and UMICH software archives.

Hotline Server 1.1b21r2

Hotline Server is a fast, simple solution for Internet and intranet connectivity. The Hotline server allows clients to connect, read a news file, chat to other connected clients and access the file library.

The Hotline Server is a small application with only a 1M memory footprint. Optimising the server for functionality rather than configurability means that many security features that an experienced Webmaster would prefer are not available. The only way a client can interact with the server directly is by using the file browser, which the server will only per-

mit to view one folder and its subsequent directories. The only user who can modify this folder is the administrator. The server itself only offers the choice of setting a Tracker server to notify, whether to notify a Tracker at all, what to log, and the maximum number of simultaneous downloads allowed. Modifying user accounts is done using the Hotline Client, connecting as the administrator, and modifying account types, similar to the concept of Users and Groups used by Mac OS.

To be used in a business environment, the Hotline Server must be secure. To achieve security under Hotline is actually very simple. For a private server, simply deleting the 'guest' user information from the user folder allows only registered users to log on. On an IP static server, registered

file transfer in preference to the slower AppleTalk protocol, and allows detailed monitoring of the server use. The advantage of Hotline is that any Macintosh can become a server, broadcasting news, personal and group messages and allow file access, all with speed and security.

Hotline Tracker 1.1b21r2

The Tracker is a piece of server software which makes Hotline servers, even those on dial-up connections, easily accessible to the public.

Hotline Tracker weighs in at only 143K. Unfortunately, running a Hotline tracker doesn't offer the host any obvious benefits. The tracker allows Hotline Servers to register their name and IP, which it then sends to connected clients in the form of a list view. The tracker administrator has no control at all over which servers it tracks, outputting whatever it is given. The upside to this is that the tracker requires no effort and very few resources, and is totally secure. The tracker will not allow connections, it will only allow for communications to and from Hotline Servers and clients.

The Hotline Tracker could be used on an intranet in the form of a directory server. Each individual server registers its name, IP and a description with the tracker, which it will then provide to all connected clients. Using this system, file transfers could all be based on TCP/IP rather than AppleTalk, allowing faster transfer speeds and removing the need to use the awkward Chooser to open a connection to a server. Also, if a server is not static, it will notify the tracker whenever it is active, making it instantly accessible to connected users rather than requiring the user to reconnect specifically to that server.

The tracker is an integral component of Hotline's function but, given the current configuration of the Hotline client, there is little reason for an individual to operate their own tracker server. If the Hotline server allowed more than one tracker to be notified, and if it became more convenient to change trackers in the Hotline client, then the tracker could serve a similar function to a newsgroup, with sites posted on a tracker of common theme, making a dynamic environment somewhere between Usenet and IRC. Until that time, the tracker will serve mostly in an intranet environment.

PPP Menu 2.0.3

PPP Menu is one of the most convenient and addictive pieces of software ever made for the Mac. The concept is simple: to have an easier way to start and terminate a PPP connection without having to open any unsightly control panels. It's not that it hasn't been done before — plenty of solutions have been based on AppleScripts. But PPP Menu simply puts a cute little icon of a blue phone on the top right-hand corner of the menu bar to give instant access to the PPP control panel, and opens and closes a connection with minimal hassle. Previously I used a control strip module loosely based on AppleScript, which caused almost as much hassle as it saved. Using AppleScript on an older Macintosh can result in quite a wait while the commands are interpreted, sometimes deciding not to work at all.

PPP Menu is a savior for people sick of waiting for AppleScript to complete the simplest of tasks. Being a control panel, PPP Menu is loaded at startup, and instantly completes any task. While a PPP connection is open, the phone is shown with the receiver off the hook, which is far less irritating than the flashing Apple/Apple Remote Access icons used by Open Transport PPP for the same purpose. Opening the PPP Menu control panel allows you to customise the menu, allowing additions of applications or scripts to provide an independent Apple menu which can be devoted to Internet functions. PPP Menu is produced by Rockstar Studios, so naturally it works with its FreePPP software and with Open Transport PPP.



users can log on without having to type passwords on each occasion by using a server bookmark file containing login and password. The default 'guest' user has very few privileges, being able only to upload and download files, read the news file or chat. They are not able to modify users in any way, so 'guests' are secure because the administrator can modify almost any aspect of their behaviour, from the file system to the ability to change their username. Only a user specifically given the ability by the administrator can perform anything out of the ordinary, including getting information on other users. User information includes name, IP and the current files being accessed, allowing each individual connection to be scrutinised and logged for later inspection.

The Hotline server performs a very useful function with simple configuration and operation. Using the Hotline Server on a LAN would allow TCP/IP to be used for



Publisher Rockstar Studios
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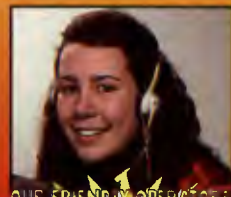
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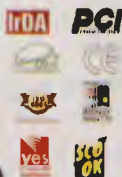
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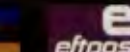
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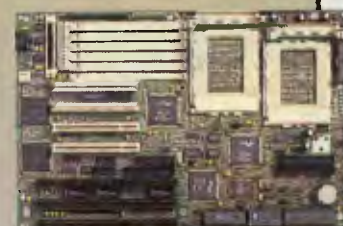
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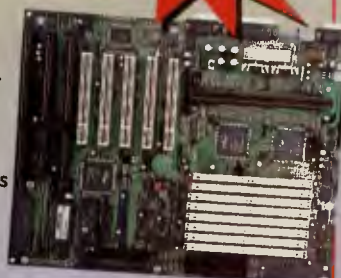
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CCGEN003	ADAPTEC 2940 PCI SCSI CARD	\$345
CCGEN004	ADAPTEC 2940 ULTRA SCSI	\$359
CCGEN005	ADAPTEC 2940 ULTRA WIED SCSI	\$425

MEMORY

Code	Model	Price
RAGEN000	4MB SIMM 72Pin 60ns	\$42
RAGEN001	8MB SIMM 72Pin 60ns	\$65
RAGEN002	16MB SIMM 72Pin 60ns	\$115
RAGEN003	32MB SIMM 72Pin 60ns	\$250
RAGEN004	8MB SIMM EDO 72Pin 60ns	\$65
RAGEN005	16MB SIMM EDO 72Pin 60ns	\$120
RAGEN006	32MB SIMM EDO 72Pin 60ns	\$250
RAGEN007	16MB DIMM 168Pin	\$139
RAGEN008	32MB DIMM 168Pin	\$259
RAGEN009	64MB 168Pin DIMM	\$CALL
RAGEN010	4MB 32Pin SIMM	\$45
RAGEN011	4MB 72Pin Parity	\$75
RAGEN012	8MB 72Pin Parity	\$155
RAGEN013	16MB 72Pin Parity	\$195

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GIGABYTE MAINBOARDS

GA586-HX

Main Board

Code	Model	Price	Code	Model	Price
MBGIG002	GA586-DX - 512K cache, Dual CPU MB 75-200Mhz CPU, MMX Support, Dual Processor Sockets, RAID Port, Ultra-Wide Adaptec 7880 SCSI controller OnBoard 8-512MB RAM (4 x 72pin SIMM), 4 x PCI, 4 x ISA, ATX Form, Intel HX Chipset	\$465	MBGIG004	GA686-FX - 150-200Mhz Pentium Pro CPU (Overdrive, MMX), 8-512MB RAM (4 x 72pin SIMM), 4 x PCI, Modem-Ring-ON/Win95-Power-Off, "ACOPS", AT Form, Intel 82440FX Chipset	\$349
MBGIG003	GA686-NX - 150-200Mhz Pentium Pro CPU, 8-512MB RAM (4 x 72pin SIMM), 4 x PCI, 4 x ISA, PS2 Keyboard & mouse, ATX Form, Intel 82440FX Chipset	\$349	MBGIG005	GA686-DX - 150-200Mhz Dual Pentium Pro CPU (Overdrive), 8-768MB RAM (6 x 72pin SIMM), 5 x PCI, 3 x ISA, ATX Form, Intel 82440FX Chipset	\$545

\$199

Code	Model	Price
MBGIG000	GA586-ATV - 256K cache, 75-200Mhz CPU 8-128MB RAM, 4 x PCI, 4 x ISA, AT Form, Intel 430VX Chipset	\$169
MBGIG007	GA586-VX - 512K cache, 75-200Mhz CPU, MMX Support, 8-128MB RAM, 4 x PCI, 4 x ISA, AT Form, Intel 430VX Chipset	\$179
MBGIG006	GA586-SVX - 256K cache, CREATIVE VIBRA-16C SoundBlaster OnBoard, 75-200Mhz CPU, MMX Support, 8-128MB RAM, (4 x 72pin	

Code	Model	Price
MBGIG008	SIMM, 1 x 168pin DIMM) 4 x PCI, 4 x ISA, AT Form, Intel 430VX Chipset	\$219
MBGIG001	GA586-TX3 - 512K cache, 90-233Mhz CPU, MMX Support, 8-256MB RAM, (2 x 72pin SIMM, 3 x 168pin DIMM) 4 x PCI, 3 x ISA, AT Form, Intel 82430TX Chipset	\$235
	GA586-HX - 512K cache, 75-200Mhz CPU, MMX Support, 8-512MB RAM, (4 x 72pin SIMM), 4 x PCI, 4 x ISA, AT Form, Intel HX Chipset	\$199

GA586-TX3

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STORAGE AND BACKUP

HARD DISK DRIVES

Maxtor

HD DRIVES

Code	Model	Cap. GB	Seek ms	Motor RPM	Price
HDMAX000	CRYSTAL MAX	1.7	11	4500	\$279
HDMAX001	CRYSTAL MAX	2.1	11	4500	\$299
HDMAX002	CRYSTAL MAX	3.5	11	4500	\$395
HDMAX003	DIAMONDMAX*	2.5	10	5400	\$345
HDMAX004	DIAMONDMAX*	5.1	10	5400	\$595

Seagate 3.5" EIDE HD DRIVES

Code	Model	Cap. GB	Int.	Seek ms	Motor RPM	Cache	Price
HDSGT001	MEDALIST	2.1	ATA-3	12.5	4500	128K	\$315
HDSGT002	MEDALIST	3.2	ATA-2	12.5	4500	128K	\$415

Seagate 3.5" ULTRA-SCSI HD DRIVES

Code	Model	Cap. GB	Seek ms	Motor RPM	Cache	Price
HDSGT006	HAWKE 2XL	2.1	9	5400	512K	\$799
HDSGT003	BARRACUDA	2.1	9	7200	512K	\$1190
HDSGT004	BARRACUDA	4.3	9	7200	512K	\$1499
HDSGT005	BARRACUDA	9.1	9	7200	512K	\$3890

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Code	Model	Cap. GB	Int.	Seek ms	Motor RPM	Cache	Price
HDQTM008	FIREBALL ST	1.6	U/ATA	10	5400	128K	\$315
HDQTM009	FIREBALL ST	3.2	U/ATA	10	5400	128K	\$415
HDQTM010	FIREBALL ST	4.3	U/ATA	10	5400	128K	\$525
HDQTM011	FIREBALL ST	6.4	U/ATA	10	5400	128K	\$695

QUANTUM 3.5" SCSI-3 HD DRIVES

Code	Model	Cap. GB	Seek ms	Motor RPM	Cache	Price
HDQTM007	FIREBALL TM	2.1	10	4500	128K	\$475
HDQTM005	ATLAS II	4.5	8	7200	512K	\$1450
HDQTM006	ATLAS II	9.1	8	7200	1024K	\$2499

Fujitsu

EIDE HD DRIVES

Code	Model	Cap. GB	Price
HDFUJ000	FUJITSU	1.2	\$275
HDFUJ001	FUJITSU	1.7	\$295
HDFUJ002	FUJITSU	2.1	\$335
HDFUJ003	FUJITSU	2.5	\$355

FLOPPY DRIVES/DISKETTES

Code	Model	Price
FDSON000	SONY 3.5" 1.44MB FLOPPY DRIVE	\$45
FDPAN000	PANASONIC 1.44MB FLOPPY DRIVE	\$45
DKGEN000	1.44MB 3.5" DISKETTES (10 PER PACK)	\$15
DKGEN001	1.2MB 5 1/4" DISKETTES (10 PER PACK)	\$15



IOMEGA PRODUCTS

Code	Model	Price
BUIOM000	ZIP DRIVE EXT. (PARALLEL PORT) - 100MB	\$235
BUIOM001	ZIP DRIVE EXT. (SCSI PORT) - 100MB	\$235
BUIOM002	ZIP DRIVE INT. 3.5 (INC. SCSI CARD) - 100MB	\$235
BUIOM003	JAZ DRIVE (SCSI EXT.) - 1.0GB	\$670
BUIOM004	JAZ DRIVE (SCSI INT.) - 1.0GB	\$505
BUIOM005	100MB PC ZIP DISKS (3 PER PACK)	\$69
BUIOM006	100MB PC ZIP DISKS (10 PER PACK)	\$210
BUIOM007	100MB ZIP INT IDE	\$235
BUIOM008	JAZ MEDIA 1GB PC DISKS (3 PER PACK)	\$465
BUIOM009	JAZ MEDIA 1GB MAC DISKS (3 PER PACK)	\$465



TAPE BACK UNITS

Code	Model	Price
BUSON000	SONY DAT DRIVE 2/4 GB INT.	\$1290
BUSON001	SONY DAT DRIVE 4/8 GB INT.	\$1450
BUBAC000	BACKPACK 800MB EXT.	\$290
BU3M0000	3M TRAVAN TR-1 400/800MB	\$245

TAPE CARTRIDGE

Code	Model	Price
BUGEN000	QIC80 DC2120 120MB/250MB COMP	\$35
BUGEN001	QIC-3020 MC300XL 680MB/1.36GB COMP	\$45
BUGEN002	QIC-WIDE 520 200MB/400MB COMP	\$45
BUGEN003	TARVAN TR-1 400MB/800MB COMP	\$49
BUGEN004	TARVAN TR-2 800MB/1.6GB COMP	\$55
BUGEN005	TARVAN TR-3 1.6GB/2.3GB COMP	\$59
BUGEN006	TARVAN TR-4 4GB/8GB COMP	\$65
BUGEN007	4MM DAT DDS-1 90M 2GB/4GB COMP	\$35
BUGEN008	4MM DAT DDS-2 120M 4GB/8GB COMP	\$39

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Code	Model	Price
DCGEN000	1MB TRIDENT ISA SVGA	\$49
DCGEN001	1MB (UP TO 2MB) PCI 64Bit EDO DRAM Soft, MPEG, S3 SVGA	\$55
DCGEN003	1MB EDO DRAM for S3	\$25
DCGEN002	TSENG LABS ET-6000 PCI, SVGA 2MB (UP TO 4MB) MDRAM 128Bit Soft, MPEG	\$90
DCGEN004	2MB DRAM for ET-6000	\$75

DIAMOND STEALTH

Code	Model	Price
DCDIA000	3D-2000XL 2MB (UP TO 4MB) DRAM 64 BIT	\$155
DCDIA001	3D-3000XL 2MB (UP TO 4MB) VRAM 64 BIT	\$295
DCDIA002	2MB DRAM UPGRADE FOR 3D CARDS	\$45

MATROX

Code	Model	Price
DCMAT000	2MB MYSTIQUE PCI 64Bit 3D/M/MEDIA ACCEL.	\$215
DCMAT001	4MB MYSTIQUE PCI 64Bit 3D/M/MEDIA ACCEL. 1280x1024 - 16.7M Col.	\$295
DCMAT002	2MB MILLENIUM PCI 64Bit (UPGRADE TO 4 OR 8MB)	\$295
DCMAT003	4MB MILLENIUM PCI 64Bit (UPGRADE TO 8MB)	\$425
DCMAT004	8MB MILLENIUM PCI 64Bit 'WORLD'S FASTEST' 1600x1200 in 3D	\$695

Code	Model	Price
DCMAT005	2MB for 2MB MATROX BOARDS	\$145
DCMAT006	4MB for 4MB MATROX BOARDS	\$295
DCMAT007	6MB for 2MB MATROX BOARDS	\$395

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Code	Model	Price
MMDIA000	DIAMOND 3D MONSTER 4MB EDO RAM	\$365
MMCREE007	CREATIVE 3D BLASTER PCI 4MB	\$395
MMCREE008	GRAPHICS BLASTER MA334 4MB M/M ACCEL.	\$269

MONITORS

GENERAL

Code	Model	Price
MOGEN000	14" SVGA 0.28DP - 1024x768	\$295
MOGEN001	15" SVGA 0.28DP - 1280x1024	\$425

MAG

Code	Model	Price
MOMAG001	DX-1495 14" SVGA 0.28DP - 1024x768	\$375
MOMAG002	DJ-530 15" XGA 0.28DP - 1280x1024*	\$485
MOMAG004	AX-1595 15" XGA 0.28DP - 1280x1024*	\$520
MOMAG003	DJ-707 17" XGA 0.26DP - 1280x1024*	\$960
MOMAG005	DJ-717 17" CAD 0.26DP - 1600x1280*	\$1350



MOMAG006	MX-21F 21" CAD XGA 0.28DP - 1600x1280	\$2350
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Acer

Code	Model	Price
MOACE001	VIEW 34T 14" N.I DIG. 1024x768	\$335
MOACE002	VIEW 54E 15" N.I DIG. 1024x768	\$440
MOACE003	VIEW 56E 15" N.I DIG. 1280x1024	\$565
MOACE004	VIEW 76IE 17" N.I DIG. 1280x1024	\$860
MOACE005	VIEW 78IE 17" N.I DIG. 1600x1200	\$995
MOACE006	PRESTIGE 21IA 21" N.I DIG. 1600x1200	\$2720

NEC

Code	Model	Price
MONEC000	C500 15" SVGA 0.28DP 1024x768 (75Hz)	\$565
MONEC001	XV15 15" 1280x1024 CTP	\$690
MONEC002	M500 15" MULTIMEDIA	\$895
MONEC003	XV17 17" 1280x1024 (75Hz)	\$1299
MONEC004	M700 17" MULTIMEDIA	\$1550
MONEC005	XP17 17" 1280x1024 (75Hz)	\$1880
MONEC006	E1100 21" 1180x1024 (60Hz)	\$3250
MONEC007	PI150 21" 1600x1200 (70Hz)	\$3995

SONY

Code	Model	Price
MOSON000	CPD-100SF 15" SVGA DIG. M/SCAN TRINITRON	\$755
MOSON001	CPD-200SF 17" SVGA DIG. M/SCAN TRINITRON	\$1535
MOSON002	CPD-300SF 20" SVGA DIG. M/SCAN TRINITRON	\$3150

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MMGEN006	COMPRO SCSI (2X WRITE/ 4X READ)	\$695
MMGEN003	HP 60201 CD SCSI (2X WRITE/ 6X READ)	\$1150
MMYAM000	YAMAHA CDR400 SCSI (4X WRITE/ 6X READ)	\$1550
MMCRE005	CREATIVE CDR4210 SCSI (2X WRITE/ 4X READ)	\$979
MMSAM000	SAMSUNG DVD DRIVER 11.1MB	\$575
MMSAM001	SAMSUNG DVD KIT DRIVERWITH M PEG	\$1090
MS-ADE005	GENERIC BLANK CDR	\$8
MS-KOD000	KODAK GOLD CD	\$10

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VIDEO CONFERENCE

Code	Model	Price
MMCRE006	CREATIVE VIDEO CONF. KIT CRI140+CRI7% TO CRI140+CRI790	\$345

MODEMS

Banksia

Code	Model	Price
FMBAN000	WAVE SP 33.6 D/F/V (SVD)	\$249
FMBAN001	MY-VOICE MODEM 33.6/14.4 - V.34	\$315

NetComm

Code	Model	Price
FMNET000	ROADSTER ULTRA 33.6 D/F/V (SVD) EXT.	\$249
FMNET001	IN-PLUS 33,600 BPS 33.6 D/F/V (SVD) - INT.	\$195
FMNET002	CARD-MODEM 33.6 D/F MODEM - PCMCIA	\$339
FMNET003	ROADSTER 33.6 EXT.	\$315
FMNET004	SMART-MODEM 33.6 V34 DES ENCRYPTION	\$479
FMNET005	MEMORY MODEM 33.6 D/F/V - EXT.	\$468
FMNET006	ROADSTER 56K EXT.	\$365

SPIRIT

Code	Model	Price
FMSP100	336L WHITE BOX D/F/V V.34 +	\$175
FMSP101	DRAGON 33.6K EXT.	\$215
FMSP102	VIPER-96 INT.V.34 33.6 DATA/ 14.4K FAX	\$165
FMSP103	COBRA 33.6K + VOICE EXT.	\$285
FMSP104	COBRA 33.6K + VOICE INT.	\$195
FMSP105	VENTURA 33.6 PCMCIA	\$350
FMSP106	SWIFT* -V.32 BIS INT. 14.4 MNP/V.42	\$75

*WINFAX LITE FAXMODEM SOFTWARE SUPPLIED.

Robotics

Code	Model	Price
FMROB001	SPORTSTER V.34 EXT.	\$199
FMROB002	SPORTSTER V.34+ 33.6 INT. (S/P)*	\$195
FMROB003	SPORTSTER V.32+ 33.6 EXT. (S/P)*	\$249
FMROB004	WORLDPORT V.34+ PCMCIA	\$399
FMROB005	COURIER V.34+ 33.6 DATA (U TO 56.6K)	\$449

*S/P = SPEAKER PHONE & 56.6K UPGRADABLE

CD ROM DRIVES

GENERAL

Code	Model	Price
MMGEN001	GENERIC 12X CDROM DRIVE	\$145
MMGEN002	8X SCSI CDROM DRIVE	\$265
MMGEN004	12X SCSI CDROM DRIVE	\$295
MMCRE002	CREATIVE 12X CDROM DRIVE	\$165
MMWEA000	WEARNES 20X CDROM DRIVE	\$190
MMGEN010	GENERIC 24X CDROM DRIVE	\$165

Acer

Code	Model	Price
MMACE001	12X CDROM DRIVE (CD912E)	\$145
MMACE002	16X CDROM DRIVE (CD616P)	\$175
MMACE003	18X CDROM DRIVE (CD616A)	\$185
MMACE004	20X CDROM DRIVE (CD920E)	\$190
MMACE005	24X CDROM DRIVE	\$195

SOUND CARDS

Code	Model	Price
MMGEN005	GENERIC 16 BIT SOUND CARD - PnP	\$45
MMGEN009	SB32 SOUND CARD	\$195
MMCRE010	SOUND BLASTER GAME PAD	\$59
MMCRE011	SOUND BLASTER AWE-64 S/C PnP	\$199
MMCRE012	SOUND BLASTER AWE-64GOLD S/C -PnP	\$460
MMCRE013	SOUND BLASTER 16 STARTER S/C -PnP	\$149
MMCRE014	SOUND BLASTER 32 STARTER S/C -PnP	\$229

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JAZZ

Code	Model	Price
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MMJAZ001	JAZZ J-211 STEREO 25W	\$25
MMJAZ002	JAZZ J-100 3D 100W SPEAKERS	\$69
MMJAZ003	JAZZ J-200 3D 200W SPEAKERS	\$75
MMJAZ004	JAZZ J-300 3D 300W SPEAKERS	\$99
MMJAZ005	JAZZ J-900 4" WOOFER	\$119
MMJAZ006	JAZZ J-930 (J300 + J900) SPEAKERS & WOOFERS	\$215
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CAADE003	ADE FULL-TOWER CASE	\$139
CAADE004	ADE ATX MID CASE	\$135
CAADE005	ADE SERVER FULL TOWER 300W	\$195
CAADE006	300W SERVER SQUARE CASE	\$295
CAADE007	SCSI EXT. HD CASE	\$155
CAADE008	CD ROM EXT. CASE PARRALLEL	\$155
CAMAC000	MACASE MINITOWER	\$125
CAMAC001	MACASE MID CASE	\$195
CAMAC002	MACASE FULL TOWER	\$235
CAMAC003	MACASE ATX MINI CASE	\$175

POWER SUPPLIES

Code	Model	Price
PSGEN000	200W POWER SUPPLY	\$45
PSGEN001	300W POWER SUPPLY	\$95
PSGEN002	200W ATX POWER	\$55
PSAPC000	APC BACK-UPS 400	\$325
PSAPC001	APC BACK-UPS PRO 420	\$450
PSAPC002	APC BACK-UPS PRO 650	\$530
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PRCAN002	BJC-210 - COL. A4 360X360 DPI, 248 CPS	\$255
PRCAN010	BJC-240 - COL. A4 360X360 DPI, 248 CPS PR*	\$375
PRCAN003	BJC-4200 - COL. A4 720X360 DPI, 510 CPS PR*	\$375
PRCAN004	BJC-620 - COL. A4 720X720 DPI, 300 CPS	\$620
PRCAN005	BJC-4550 - COL. A3 720X360 DPI, 510 CPS PR*	\$695
PRCAN006	BJ-330 A3 - COL. 360X360 DPI, 600 CPS	\$850
PRCAN007	BJC-880 A3 - COL. 360X360 DPI, 300 CPS	\$4650

*PR = PHOTO REALISTIC COLOUR QUALITY

Canon

Code	Model	Price
PRCAN009	LBP 1260 .600 DPI 12PPM PCL5E 250/100 TRAYS 6MB	\$2140
PRCAN011	LBP 660,600 DPI 6PPM FAST WINDOWS PRINT	\$585



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PRHPD000	PORT 340 , OPT. COL. KIT, 600DPI	\$435
PRHPD001	DESKJET 400 OPT. COL. KIT	\$279
PRHPD002	DESKJET 670C, 600DPI, COL.	\$375
PRHPD003	DESKJET 690C, 600DPI, OPT. COL. PHOTO. KIT	\$449
PRHPD004	DESKJET 820CXI, 600DPI, COL. 6PPM	\$580
PRHPD005	DESKJET 870CXI, 600DPI, COL. 8PPM, PC/MAC	\$754
PRHPD006	DESKJET 1600C, 600DPI, 4X COL. PRO. RESULTS	\$2210
PRHPD007	DESKJET 1600CM, 600DPI, 4X COL. MAC/PC/N/WORKS	\$3225
PRHPD020	HP OFFICEJET PRO 1150C	\$1450

Code	Model	Price
PRHPD008	OFFICEJET PRO 350 600DPI COL./SCAN/FAX/COPIER	\$1115
PRHPD009	LASERJET 6L, 600DPI, 6PPM, FAST WINDOWS PRINT	\$695
PRHPD010	LASERJET 6P, 600DPI, 8PPM, 2MB RAM	\$1235
PRHPD011	LASERJET 6MP, 600DPI, 8PPM, PC/MAC *	\$1585
PRHPD012	LASERJET 5, 600DPI, 12PPM, 4MB RAM	\$2375
PRHPD013	LASERJET 5N, 600DPI, 4MB RAM 10BASE-T	\$2750
PRHPD014	LASERJET 5M, 600DPI, MAC/PC/NETWK *	\$3025
PRHPD015	LASERJET 4V, 600DPI, A3 PAPER, 16PPM	\$3490
PRHPD016	LASERJET 4MV, 12MB RAM, A3, PC/MAC/NETWK *	\$4950
PRHPD017	LASERJET 5SI, 24PPM, TWO BIN	\$5065
PRHPD018	LASERJET 5SIMX, 24PPM, TWO BIN	\$7770
PRHPD019	LASERJET 5SINX, 24PPM, TWO BIN *	\$5459
PRHPD021	HP DESKJET 692C	\$439

*DENOTES POSTSCRIPT

EPSON

Code	Model	Price
PREPS000	STYLUS COL. 200, 720X360 DPI, 240CPS	\$275
PREPS001	STYLUS COL. 400, 720X720 DPI, 3PPM, WIN COMP.	\$405
PREPS002	STYLUS COL. 600, 1440X720 DPI, 3PPM, WIN COMP.	\$499
PREPS003	STYLUS COL. 800, 1440X720 DPI, 7PPM	\$729
PREPS004	STYLUS COL. PRO, 720X720 DPI, 5PPM	\$CALL
PREPS005	STYLUS COL. PRO XL, 720X720 DPI FULL BLEED A3	\$1915
PREPS007	LQ-570+ 24PIN	\$579
PREPS010	STYLUS COL. 1520 1440X720 DPI AZ	\$1695



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IOGEN001	HONEYWELL GENUINE - 104/WIN95	\$45
IOMST000	MICROSOFT NATURAL ERGO- 104/WIN95	\$85

Acer

Code	Model	Price
IOACE002	ACCUFEEL 104 KEY GENERIC RUBBER	\$35
IOACE000	FUTURE ERGO WIN95 (with touch pad)	\$125
IOACE001	ACER AIR-KEY WIRELESS KEYBOARD	\$130



MICE

Code	Model	Price
IOMST001	MICROSOFT BUS MOUSE - SER./PS2	\$95
IOMST002	MICROSOFT HOME MOUSE	\$65
IOMST003	MICROSOFT INTELLI-MOUSE	\$95

Code	Model	Price
IOMST004	GENIUS 3 BUTTON MOUSE - SER./PS2	\$25
IOLOG000	LOGI-TECH 3 BUTTON DELUXE MOUSE	\$35

SCANNERS

GENERAL

Code	Model	Price
IOACE003	ACER 300 A4 COLOUR 4800 DPI	\$335
IOACE004	ACER 610 A4 COLOUR H-RES	\$595
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IOHPD001	5P FLATBED 24 BIT COLOUR 300DPI	\$535
IOHPD002	4P FLATBED 24 BIT COLOUR UP TO 1200DPI	\$699
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IOMST007	M/SOFT SIDEWINDER GAME PAD	\$75
IOLOG001	L/TECH WINGMAN WARRIOR	\$149

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NW3CO000	3COM ETHERLINK III ISA RJ45 3C509B-TPO	\$155
NW3CO001	3COM ETHERLINK III ISA 3C509B-COMBO	\$205
NW3CO002	3COM ETHERLINK III ISA RJ45/10B5AUI	\$185



NW3CO003	3COM ETHERLINK XLPCI 3C900-TPO	\$185
NW3CO004	3COM ETHERLINK XL PCI 3C900-COMBO	\$220
NW3CO005	3COM FAST ETHERLINK XL PCI 10/100BT	\$185
NW3CO006	3COM FAST ETHERLINK ISA 10/100TX 3C515TX	\$265
NW3CO007	3COM PCMCIA ETHERLINK III 3C589D-TP	\$229
NW3CO008	3COM PCMCIA ETHERLINK III 3C589D-COMBO	\$310
NW3CO009	3COM PCMCIA ETHERLINK III TP/33.6K F/M	\$550
NW3CO010	3COM PCMCIA ETHERLINK III COMBO/33.6KF/M	\$615
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NW3CO012	3COM OFFICECONNECT 8 PORT UNM HUB	\$245
NW3CO014	3COM OFFICECONNECT 8 PORT HUB 100BASE-TX	\$1290
NW3CO015	3COM OFFICECONNECT 16 PORT UNM HUB	\$455

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NWGEN001	PCI NETWORK CARD COMBO	\$45
NWGEN002	MINI 5 PORT HUB	\$85
NWGEN003	GENERIC 8 PORT ETHERNET HUB	\$125
NWGEN004	GENERIC 16 PORT HUB	\$175
NWGEN005	PCMCIA ETHERNET BNC+RJ45	\$175
NWGEN006	POCKET ETHERNET PARRALLEL COMBO	\$189
NWGEN009	INTEL ETHEREXPRESS PRO/10 PCI TP (RJ45)	\$115
NWGEN010	INTEL ETHEREXPRESS PRO PCI 10/100TX (RJ45)	\$145
NWGEN011	ETHERNET TRANCEIVER AUI TO RJ45	\$65
NWGEN012	ETHERNET TRANCEIVER AUI TO BNC	\$65
NWGEN013	INTEL ETHERNET PRO PCI COMBO 10	\$165
NWGEN014	INTEL ETHERNET EXPRESS ISA COMBO 10	\$145
NWSMC000	SMC 8432 PCI RJ45	\$95
NWSMC001	SMC 8432 PCI COMBO	\$125
NWSMC002	SMC 9332 PCI 10/100 TP	\$145
NWSMC003	SMC ETHEREZ ISA COMBO	\$129
NWXIR000	XIRCOM PCMCIA 10BASE-2 (BNC)	\$285
NWXIR001	XIRCOM PCMCIA 10BASE-T (RJ45)	\$229
NWXIR002	XIRCOM PCMCIA ETHERNET COMBO	\$295
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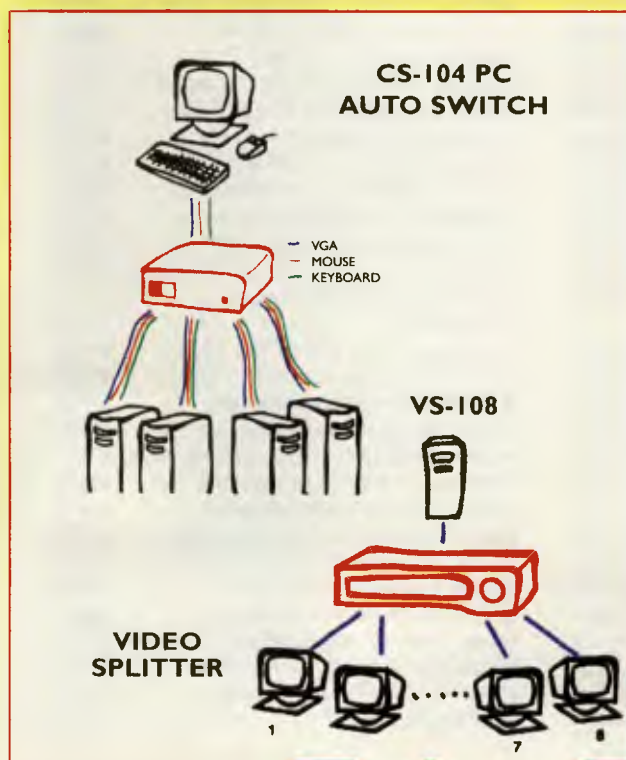
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DS-ADE003	SXP-320 OR IC100 BIDIRECTION CONVERTOR	65.00
DS-ADE004	IC-485 RS232 TO RS485	65.00
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DS-ADE006	IC-162R LINE EXTENDER RV	50.00
DS-ADE007	MP451 4 TO 1 PRINTER AUTO SW	35.00
DS-ADE008	AS811P 8 TO 1 PRINTER AUTO SW	120.00
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DS-ADE011	AS-411S SERIAL AUTO SW	95.00
DS-ADE012	AS-811S SERIAL AUTO SW	155.00
DS-ADE013	AS-152P BI-D PRINTER AUTO SW	55.00
DS-ADE014	AS-154P BI-D PRINTER AUTO SW	65.00
DS-ADE015	AS-415S SERIAL AUTO SW	45.00
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CB-GEN012	20M SERIAL DB25M/DB25M	25.00
CB-GEN013	1.8M SERIAL DB25M/DB25F	9.00
CB-GEN014	3M SERIAL DB25M/DB25F	12.00
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CB-GEN016	10M SERIAL DB25M/DB25F	17.00
CB-GEN017	20M SERIAL DB25M/DB25F	25.00
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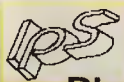


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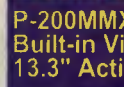
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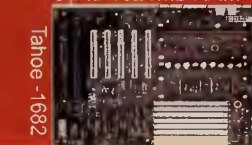
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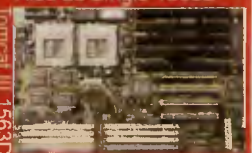
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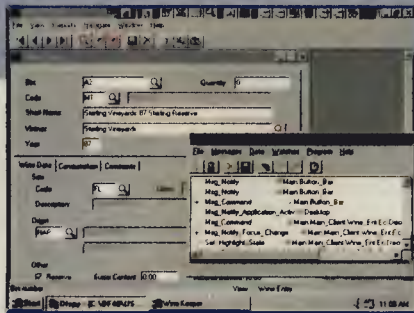
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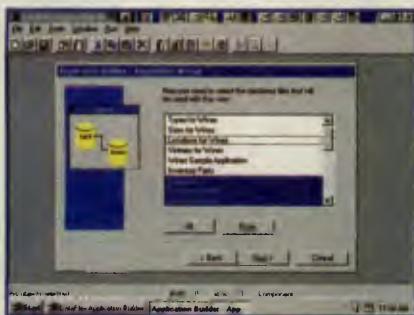
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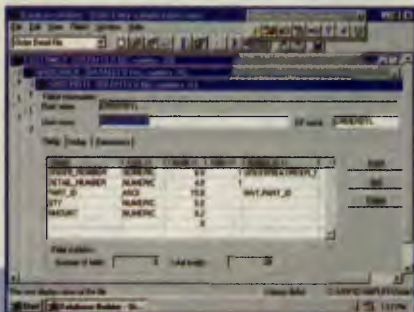
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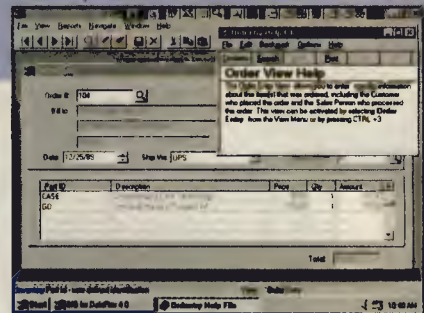
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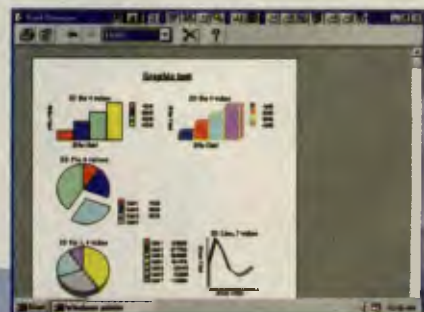
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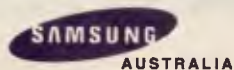
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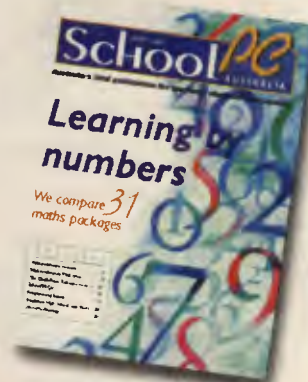
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- ☐ 7. Project Manager/Group Leader
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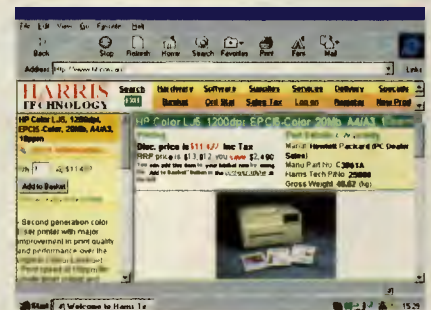
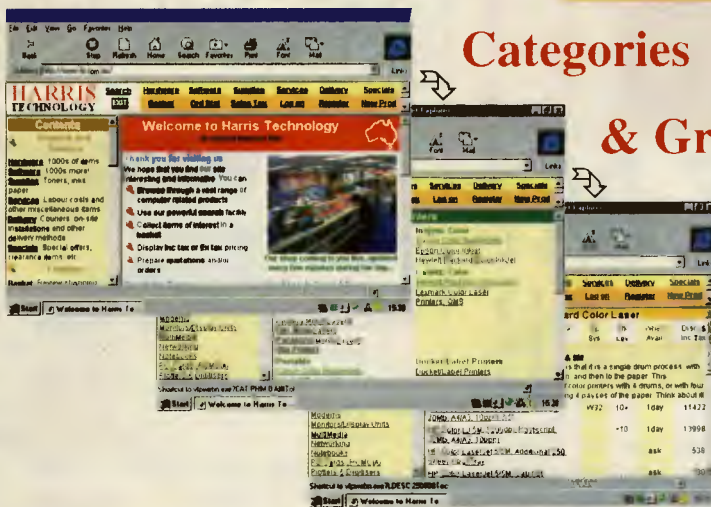
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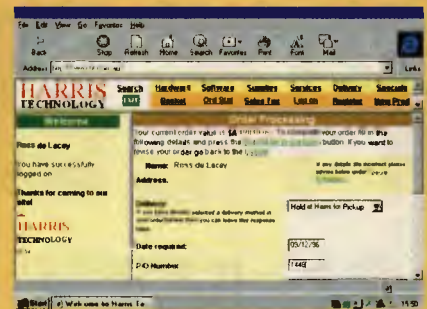
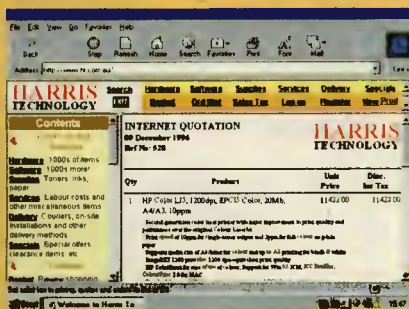
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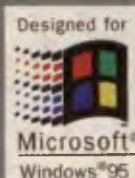
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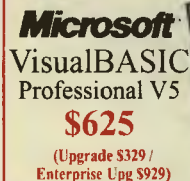
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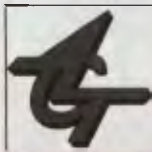


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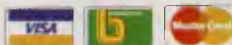
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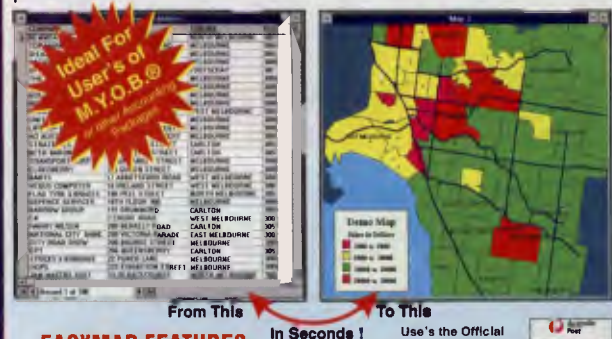
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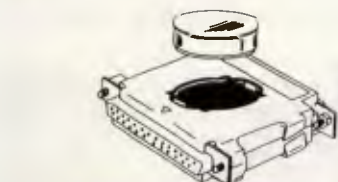


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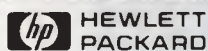
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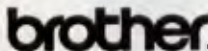
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APC-FM3-07/97

Need to enhance your Web site's performance? Check out this month's book reviews for valuable lessons about marketing on the Web.

Marketing on the Net

Strategic Internet Marketing

Although Tom Vassos has impressive credentials as manager of Internet strategies for IBM, he keeps the majority of this book accessible to all readers. Vassos dwells at length on the planning stages of the marketing strategy. The content comes in easily digestible, bite-sized chunks, and each step is illustrated with good working examples. He uses question-and-answer sessions to determine whether marketing your products or services on the Internet is a good strategy.

Vassos also (unusually for a computer expert) explores the Internet's sociometric potential and its capabilities as a marketing analysis tool. One chapter deals with the merits of designing an Internet-specific marketing policy rather than merely duplicating a physical model. The section on Web site design is thought-provoking, and it questions the advantages of using a traditional, hierarchical home-page model for a sales-based Web site.

Vassos writes in a style akin to that of a sales presentation, with plenty of illustrations and hot tips as well as a dazzling array of examples and techniques at work. This approach can seem fragmented to those accustomed to a consecutively structured format, but makes most of the topics easy to digest, if a little staccato.

Though the book was only published recently, Vassos wrote it in 1996, and quite a few of the example Web sites are no longer in existence. Also, his chapters on the use of live Internet transactions are slightly out of date. Despite this, as an informed and highly original look at the A to Z of marketing and selling on the Web, *Strategic Internet marketing* is very much in the required reading league.

Jeremy Torr



■ Author	Tom Vassos
■ Publisher	QUE
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2200
■ Price	\$29.95
■ ISBN	0-7897-0827-2

Internet Marketing Plan

If you buy this book, make sure you have a pencil handy. Author Kim Bayne is keen on readers filling in lists and tables as a means of deciding the next step in their marketing plan. This may

seem laborious to the 'just do it' reader, but it has its advantages.

Bayne's approach is based on real-life experience — she has obviously been in the Internet marketing arena for some time. Rather than take the usual approach, full of high-flying claims and amazing potential, she cautions against the dodgy dealer, the would-be Internet marketing expert and the backyard ISP that promises but doesn't deliver.

The book is very thorough, and more attuned to individual requirements than the Vassos publication (see above). Bayne

emphasises how potential Internet marketers — even down to the local house painter — must take care to match their product or service to the potential of the Internet as part of an overall strategy, not just as a standalone effort. She offers seminal advice on how to link Web-marketing activities to trade shows and other real-world events.

The final chapter includes a well-thought-out appraisal of how to quantify responses from the Web — very important in any marketing plan. The

book includes a disc that duplicates the numerous checklists and questionnaires. For the Web-marketing newcomer, a very solid, useful and practical book.

Jeremy Torr

■ Author	Kim Bayne
■ Publisher	Jacaranda Wiley
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$75.95
■ ISBN	0-471-17295-2

Web Marketing Cookbook

If you are a small-business owner, or manager of a non-profit organisation, and you have been wondering how you can use the World Wide Web to increase your business, then this book is for you.

According to the authors of *Web Marketing Cookbook*, the Web delivers information and makes sales more efficiently and at less cost than any other medium. In fact, you may even emulate the success

In short

Web Catalogue Cookbook

As the title suggests, this book offers advice on building a professional looking and operating Web catalogue for displaying products and services. It includes a CD-ROM with helpful advice and templates.

■ Authors	C Allen and D Kania
■ Publisher	Jacaranda Wiley
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$76.95
■ ISBN	0-471-18331-8

Creating the Virtual Store

This book shows how you can turn Web browsers into buyers by offering the ability to make cash transactions over the Internet. It covers everything from budgeting and planning to selecting the right technologies for creating such a store, to advertising, promotion and sales in cyberspace.

■ Author	M Yesil
■ Publisher	John Wiley and Sons
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$49.95
■ ISBN	0-471-16494-1

Measuring the Impact of Your Web Site

The authors provide techniques and commercially available tools for measuring Web site traffic and visitor behaviour, and help you choose the right ones for the job. The book features case studies from many successful and some less successful corporate Web site pioneers.

■ Authors	R Buchanan and C Lukaszewski
■ Publisher	John Wiley and Sons
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$59.95
■ ISBN	0-471-17249-9

Creating the Virtual Classroom

Various types of distance learning are discussed in this book, including email, Web sites and online conferencing. It covers the creation of virtual classrooms, and security and copyright issues surrounding the Web.

■ Author	L Porter
■ Publisher	John Wiley & Sons
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$59.95
■ ISBN	0-471-17830-6

Creating Commercial Web Sites

This book highlights the difference between creating informational Web pages and marketing Web pages from which readers can profit. It provides guidelines, instructions and references for creating commercial Web systems.

■ Authors	B and K Hampton
■ Publisher	Prentice Hall
■ Distributor	Prentice Hall
■ Phone	(02) 9454 2222
■ Price	\$79.95
■ ISBN	1-575-21169-6

Laura Lemay's Guide to Sizzling Web Sites

A four-colour guide to the hottest sites on the World Wide Web. It covers where they

are, how they were created, and how to create your own sizzling sites.

■ Author	L Lemay
■ Publisher	Prentice Hall
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2222
■ Price	\$69.95
■ ISBN	1-5752-1221-8

Web Sites That Work

This 240-page book presents simple, commonsense rules and tools for creating Web sites that work. It includes opinionated reviews of Fortune 500 Web sites, advice on how to make creative teams function best, and forecasts on the future of the Internet.

■ Author	R Black
■ Publisher	Hayden Books/Adobe Press
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2301
■ Price	\$69.95
■ ISBN	1-56830-346-7

The Second Industrial Revolution: Reinventing Your Business on the Web

"Winning means getting to the future first", according to this book's author. Donovan provides senior executives with advice on how to reinvent their business and how to use the Internet.

■ Author	J Donovan
■ Publisher	Prentice Hall
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2301
■ Price	\$19.95
■ ISBN	0-13-745621-2

MicroGram Computers

Calculator Keypad



Ideal for POS and industrial applications! This 26 key calculator keypad has an LCD display allowing entered digits to be visually verified before "sending" the data to the PC. It connects via the standard keyboard socket. Features include:

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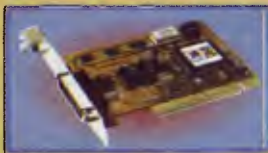
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Cat. No. 2616 **1 Port RS232 16650 PCI PnP** \$174
Cat. No. 2617 **2 Port RS232 16650 PCI PnP** \$220

Also available for the PCI bus, is a combination two port serial and single port bi-directional printer card.

Cat. No. 2620 **Serial/Parallel PCI PnP: 2S/1P** \$230

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Cat. No. 11282 **PCI 10/100 Mbps PnP Network Card** \$199

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Cat. No. 11620 **Controller to User Cable (Std)** \$31
Cat. No. 11621 **Controller to User Cable (PS/2)** \$31

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Cat. No. 6384 **Ext Case 2 x 3.5/5.25" HDD or CD ROM SCSI** \$179

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Cat. No. 3311 **Audio Video Distribution Amplifier** \$439

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Cat. No. 8421 **Infra Red Serial Link** \$139

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Perspective: A war of words

Sun Tzu: War and Management

Using the Chinese classic *Art of War* as a framework, this book explores the similarities between Sun Tzu's principles and theories of war (dated 400BC) and the world of business. The authors acknowledge that this analogy is not novel, but they argue that researchers have only recently shown interest in applying military concepts to management and marketing.

The authors have organised Sun Tzu's thoughts into a model comprising five major components which would be familiar to students of modern strategic management: situational appraisal, formulation of goals and strategies, evaluation of strategies, implementation of strategies, and strategic controls. Indeed, the majority of the book is spent exploring in depth each step in this model, concluding with chapters that discuss human and operational factors in the implementation of strategies, and the art of strategic management and thinking.

Along with its relevance to business practice, *War and Management* attempts to shed light on the nature of the US/Japan trade conflict, and the effects of the opening of China.

Rather than a step-by-step guide to strategic management, *War and Management* is a systematic analysis of the similarities between these two worlds, and serves to provide the stimulus for sound strategic thinking. It also discusses the problems that may arise as a result of this analogy, such as ethical dilemmas.

At \$19.95, this book is an illuminating read for anyone interested in strategic management. Unfortunately, typing errors, misspelt words, incomplete sen-

tences and repeated lines of text detract from this otherwise comprehensive text.

Cathie Kennedy

■ Authors	Chow-Hou Wee, Khai-Sheang Lee, Banbang Walujo
■ Publisher	Addison-Wesley
■ Distributor	Addison Wesley Longman
■ Phone	(03) 9697 0666
■ Price	\$19.95
■ ISBN	0201-628-597

Digital Literacy

Who needs digital literacy? According to Paul Gilster, we all do, as the information juggernaut of the Internet continues its advance, slowly but surely changing our lives forever. This book calls for a change in the way we absorb information.

Finding relevant information on the Internet is not enough; we also need to develop certain skills if we are to manage



this tool, and the most essential skill, according to Gilster, is the ability to critically evaluate the information we access.

Unlike conventional information sources, much of the Internet is unfiltered by editors. Where traditional information sources offer ready-made and often slickly-designed content, the Internet requires that we build the content ourselves. In fact, an unconsidered view of the content of the Internet can be misleading, deceptive and even dangerous.

This is a challenging book. It is demanding to read because it confronts the assumptions we have brought to the way we access information. It is also practical, with a chapter that notates a full day that the author spent on the Internet examining newsgroups, searching for wedding sites in preparation for his daughter's impending marriage, checking financial markets, and shopping for rare books. Through sharing this day, we grasp the significance of the mix of high technology and daily life that the Internet brings.

Other chapters examine searching the virtual library and the many ways this differs from traditional libraries, the connection between building perspective and acquiring knowledge via the Internet and the future for the digitally literate.

Digital Literacy is recommended for people interested in understanding the long-term, macro view of the Internet's impact on the global village.

Deborah Vaughan

■ Author	Paul Gilster
■ Publisher	Wiley Computer Publishing
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$34.95
■ ISBN	0-471-16520-4

of Virtual Vineyards, which allegedly generated gross sales in excess of \$US9 million in its first year of operation. The key to such success, according to the authors, is a well-planned and appealing Web site.

Bundled with a CD-ROM that contains ready-to-use templates appropriate for a Web site, such as a brochure, newsletter, advertisement, catalogue page, company profile and product order form, the book is suitable for beginning Web site developers with little technical knowledge.

Web Marketing Cookbook is well structured and easily navigable. It has chapters on selling techniques for the Web, factors to consider when planning your Web marketing efforts, considerations for text and graphical information, use of multimedia elements, creation of useful navigation paths and links, and legal considerations. It also succinctly summarises the top guidelines for creating both Web pages and a complete site, and lists the eight most common mistakes on Web sites.

The use of colour on some of the examples would have been helpful, given the

impact that colour adds to a Web site. The text on the templates reproduced in the book is difficult to read — too small and faint. However, these factors do not detract from the overall hands-on value of this book.

Deborah Vaughan

■ Authors	J King, P Knight and J Mason
■ Publisher	Wiley Computer Publishing
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	\$67.95
■ ISBN	0-471-17911-6

Never have encyclopedias offered better value for money. Even Britannica has dropped from \$1,980 to \$299, while its competitors range from \$70 to \$120. All offer the facility to print text and pictures, and many offer sound, video, photographs and quizzes. **By Linda Bruce and John Hilvert**

Rule Britannica

Encyclopaedia Britannica

Widely regarded as the definitive source, Encyclopaedia Britannica is great value for money, offering almost three times the text of its nearest rivals.

However, Britannica CD has a clumsy search engine and contains less video, sound and information on Australian geography and history than most other CD-ROM encyclopedias.

Britannica CD 97 installs easily, having done away with the copy-protection system that requires you to insert a dongle in the back of your computer. The single disc contains a wealth of information spread over three databases: Articles, Index and Merriam-Webster's Collegiate Dictionary. Articles contains over 65,000 subjects. The index contains 400,000 references linked to articles, images and tables.

For Net-savvy users, Britannica employs the Netscape Navigator browser. It also offers natural language searches as well as Boolean, where you use the operators 'and' or 'not'. You can also search for topics by using the 'Propedia' and check

■ Publisher	Encyclopaedia Britannica
■ Distributor	Encyclopaedia Britannica
■ Phone	1800 251 204
■ Online	http://www.eb.com
■ Price	\$299
■ Requires	486, MS-DOS 5.0, Windows 3.1 or higher, 4M of RAM.

Compton's Interactive Encyclopedia 1997

Compton's Interactive Encyclopedia (CIE 97) offers fine video and sound, and rivals the Australian Infopedia for information on Australia.

The search engine is fantastic. You can search alphabetically or build an advanced search by the operators 'and', 'not', 'adjacent', 'near 4', 'near 9' and 'near 16', and articles are displayed in order of relevance with the word/s you seek highlighted.

The massive search area contains 37,000 articles, 8,000 photos, maps and charts, interactive timelines, dictionary and thesaurus, 17 hours of sound and music, MIDI compatibility, and over 100 video sequences. A Planetarium depicts the night sky from wherever you are on earth, and you can create presentations with the Showmaker. All this plus monthly updates via the Internet.

The program is hardware hungry — of the encyclopedias reviewed here, it was the only one that installed easily on a Pentium but turned up its nose at a 486. CIE 97 also suffers from unsynchronised windows (like all the encyclopedias here), a poor atlas and some faulty links.



Overall, a friendly, comprehensive resource offering good value for money.

■ Publisher	Compton's NewMedia
■ Distributor	Dataflow
■ Phone	(02) 9417 9710
■ Online	http://www.comptons.com/
■ Price	\$70
■ Requires	486DX2/66, DOS 5.0 or higher, Windows 3.1 or higher, 8M RAM, soundcard.

The Hutchinson Multimedia Encyclopedia

The Hutchinson Multimedia Encyclopedia is based on the reference databases of the hardback encyclopedia of the same name, which has led the home encyclopedia market for 50 years.

Of all encyclopedias, Hutchinson is the best integrated with the Internet. For information on Canberra, for example, it listed a URL at the Australian National University to access further information. Unfortunately, it isn't possible to copy the



an alphabetical list of countries that links to geographical, cultural and historical information. Britannica's biggest flaw is that you can only search the three main databases one at a time.

Encyclopaedia Britannica CD 97 is a powerful electronic resource. Although it lacks the diagrams contained in the hardback \$2,000 version, the CD-ROM makes it easier to locate relevant material and to copy text for research — and is \$1,600 cheaper. Great for both home and office.

URL electronically and paste it into Netscape.

It features over 39,000 articles, 1,500 bibliographies, 6,000 quotations, 100 specialist essays, 400 tables and chronologies, a dictionary of difficult words, a timeline and automatic pop-up screens with events that took place on a certain day of the year. Twenty guided tours provide text overviews of topics such as The Human Body, The History Of Cinema, and Ecology, and you can customise the Quiz sec-

tion for different age groups and knowledge levels.

On the downside, Hutchinson is difficult to navigate, and is plagued by ambiguous icons, limited Help and a well-hidden copy-and-print facility.

If you have the time, you can search by specific word, use the indexes, explore by subject or by media category, or browse a gallery. You could also follow trails of related articles and use filters to narrow your search.

Once you become familiar with these strategies, Hutchinson Multimedia Encyclopedia, which has a more British and European slant than its US counterparts, and useful essays and quotations, could be well worth your while.

■ Publisher	Helicon
■ Distributor	Hilad Corporation
■ Phone	(02) 9281 3335
■ Online	http://www.hilad.com.au
■ Price	\$80
■ Requires	486DX, Windows 3.1 or higher, 8M RAM.

Australian Infopedia 2.0

Australian Infopedia 2.0 is the best general encyclopedia for information on Australia. It combines eight reference works: Funk and Wagnall's 29-volume encyclopedia; the Macquarie Concise Dictionary; the Macquarie



Dictionary of Quotations; the Macquarie Concise Thesaurus; the Hammond Atlas; Merriam-Webster's Dictionary of English Usage; The World Almanac & Book of Facts and Merriam Webster's New Biographical Dictionary.

Its strengths include easy installation, a spoken orientation, and the option of accessing the search window directly from the opening screen. You can search for specific words or phrases, use Boolean operators, or search by topics and media divisions. The browser displays relevant entries alphabetically and indicates the Infopedia book it was found in.

Interactive News

● With the closing of the doors at last month's Sydney Home Computer Show, Australia's six remaining Encyclopaedia Britannica salespeople found themselves jobless but hardly surprised. Shifts in international sales patterns and plunging profit margins have forced EB Australia to lay off all dedicated sales staff a year after their American counterparts suffered the same fate. Sales will now be conducted through retail stores or via the telephone.

The changes have meant a complete philosophical turnaround for the company. "We see ourselves as electronic publishers now. Essentially we are selling a database of information. How we sell it depends on consumer demand," said EB's marketing manager, Peter Higgins.

And EB consumers are demanding CD-ROM versions of the encyclopedia that retail for \$299 — \$1,697 less than the bound volumes and over \$200 more than competing CD-ROM products. With an ever increasing 80% of sales now exclusively on CD-ROM, research indicates that this trend will spill into other areas. Independent research conducted by Higgins indicates that by the year 2012, 88% of Australia's information will be available digitally.

● Making money on the Internet isn't as easy as it used to be. Steve Outtrim, the 23-year-old software whiz behind Sausage Software found that out the hard way. After riding high on 10 months of awe and public adulation, Outtrim spent last month in Silicon Valley sourcing funding for his ailing company.

Following plummeting share prices, and the well-publicised sacking of dozens of employees earlier this year, the company is pinning its hopes of resurrection on eVend, its new Internet commerce strategy. However, eVend encourages Web sites containing valuable content or intellectual property to charge on a pay-per-view basis rather than supplying it free as most sites do — an idea that may not sit well with Internet users who are used to free content, free software and immediate access to the latest news and technology.

● However, the news isn't all bad for Australian companies. OzEmail posted its revenues for the first quarter of 1997 at \$10,752,000, a 165% increase from the first quarter of 1996. In addition, OzEmail's customer base rose 10% to 119,500 members. OzEmail is looking at increasing that figure even further, with president David Spence divulging that, at the time of writing, the company was considering buying out up to six smaller ISPs, rumoured to include Access One.

Samantha Amjadali

■ Publisher	The Learning Company
■ Distributor	Roadshow
■ Phone	(02) 9552 8700
■ Online	http://www.village.com.au/vrs/owa/galleria
■ Price	\$99
■ Requires	486, Windows 3.1 or higher, 8M RAM, soundcard.

Science Master

Science Master from Smartworks is a real bumper pack containing four CD-ROMs which together incorporate the whole gamut of sciences. Biology, Chemistry, Physics 1 and Physics 2 CD-ROMs all link together through a common icon-driven front end to offer a very reasonable book-like interface.

Science Master has a broad range of subject areas on offer, complete with book-

marks and progress charts for the student to work with. All these disks would be ideal as a quick, easy way to revise specific topics, thanks to the way they work through each subject with simple yet useful diagrams and linked text and explanation.

For learning from scratch they might be less useful, as they tend to be a little cursory, and offer little or no interaction other than a topic quiz. But for under \$60, this package has to be worth looking at if anyone in the family has science exams coming up.

Jeremy Torr

■ Publisher	Accurate Research
■ Distributor	Dataworks
■ Phone	(02) 9417 9700
■ Online	http://www.drcdrom.com
■ Price	\$60
■ Requires	486/33, 8M RAM, 2x CD-ROM, soundcard.



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COCKLE 2706

Sugar and spice and some other things that aren't quite as nice as that, frankly.

All things being sequel

Commanche 3

Commanche 3 is quite an impressive new offering, developed by Nova Logic. The game is rich in graphical detail and challenging scenarios, and has some of the coolest ground effects to grace a flight-simulation game to date.

The most obvious difference between Commanche 3 and its predecessor is that it abandons the arcade-game feel of Commanche 2. Commanche 3 is more seriously oriented towards combat simulation. Although you can set up the flight controls in 'novice mode', this game is better suited to those who hunger for battlefield realism, even if it means some pre-flight study of flight procedures and tactics.

Commanche 3 is set during a Cold War-inspired standoff between the countries of the former Soviet bloc and NATO forces. This serves as the backdrop for realistic and involved military conflict using some of today's most potent land and air weapons platforms.

One notable aspect is the amazing level of graphical detail. The landscape has been rendered using Nova Logic's new Voxel Space 3D technology. This 3D software looks impressive with its competently rendered buildings, trees, valleys and hills. The game also features some of the most sophisticated atmospheric effects I have seen this year — sun flares, palls of smoke and explosions. Soviet ground forces like Sam launchers, Scud transporters, and T80 tanks are so well drawn that they are clearly recognisable at a distance.

Commanche 3 offers over 30 missions.



Some of the later scenarios are complicated and extremely challenging with multiple threats to your wondrous whirlybird, and more than a few mission objectives per sortie.

Controlling your helicopter is not easy, as height, rotor attitude and pitch need to be constantly adjusted if you want to manoeuvre nimbly. You must also think your way through each mission — an itchy trigger finger and a Rambo attitude are definitely not assets.

Commanche 3 is a very good example of an in-depth chopper combat simulator, albeit a bit memory hungry — it only performs well in full detail on a P166 (or higher) machine.

Steve Polak

■ Distributor	Electronic Arts
■ Phone	(02) 9955 7744
■ Online	http://www.ea.com/afflabel/wolf.html (commanche)
■ Price	\$89.95
■ Requires	Pentium 100, Windows 95, 4x CD-ROM, 16M RAM.
■ Classification	G
■ Rating	★★★★★

Ecstatica 2

Ecstatica 2 is a moody medieval romp where you discover, to your horror, that your sleepy little village has been occupied by demons, and all of the townsfolk have either been slain or driven out of the area. The game is quite distinctive because all of the objects are built with ellipses instead of polygons, in a refreshingly original 3D graphic system. Objects built with ellipses have a more organic appearance than traditional 3D polygonal building blocks, which are based on squares and triangles. 3D forms in Ecstatica 2 thus look more natural and realistic, and this certainly helps bring the game to life.

As you wander about the village, you slowly discover that a sorcerer is leading the demons in the assault against your town,

Games News

● A **Command and Conquer** clone is nearing completion. Dark Reign is a brilliant-looking real-time strategy game which might just set the world on fire when it is released. The game features a whole host of units (you can even design them yourself), and, more importantly, your units can be given very complicated commands and waypoints. This one should be in stores any day now.

● If you like doing magical things in fantasy worlds, you will be pleased to hear that **Lands of Lore 2** is nearly complete. It is set to combine 3D real-time gameplay (à la Doom) with all things Tolkeinesque. Due in September.

● You may have recently purchased the Counterstrike add-on for the extremely successful real-time strategy game **Red Alert**, and you may have been disappointed by the fact that the new



playable units in the game (Soviet commandos, Tesla tanks, nuclear subs) weren't available for use in multiplayer games. Well the good news is that the developer, Westwood, is in the process of releasing a patch that should correct this. Go to <http://www.westwood.com>.

● Classic arcade jaunt **Bombberman** is set to come to the PC. **Atomic Bombberman** pits you against a number of similarly-equipped computerised or human foes, and lets you run each other ragged as you chase each other around mazes, live explosives in hand. It should be here by the time you read this issue of APC.

Steve Polak



This cinematic technique has the unfortunate side effect of disrupting the game's flow at times — a potentially lethal flaw if you are fighting a pitched battle from



and the game becomes a quest to eliminate the evil villain. *Ecstática 2* is a straightforward, cathartic, combat-based adventure. You must use fisticuffs as well as a number of weapons to punch, kick, slice and bludgeon your way through the demonic hordes. To some extent the game is simplistic, but it's compelling and engrossing because the gameworld is so richly depicted, and because different tactics are necessary to successfully dispatch your numerous opponents. The areas you can wander through are many and varied, and pleasing to the eye. You can ferret about in catcombs, dungeons, high parapets, libraries and stables, and there is even a bit of waterborne exploration as you negotiate the local castle's moat.

Better still, the menacing menagerie of malevolents has been masterfully assembled. There are walking imps, giant ogre demons, spiders, crawling demons, killer fish and flying gargoyles. You really have to keep your guard up, as the next attack may come from any direction. To combat this you have a variety of offensive and defensive manoeuvres at your disposal that can be performed smoothly and effortlessly. To avoid damage, you can block, sidestep, roll, run and backward somersault. More importantly, you can dish out four basic types of attack that can be combined to form different offensive combinations that are devastating when timed properly.

Ecstática 2 is set to one of the most discordantly appropriate soundtracks I have heard in a game of this genre. The music is liltingly eerie, and keeps the tension beautifully by matching the action.

The only problem with *Ecstática 2* is the occasionally awkward use of static cameras to view the action. As you enter a room or area, the screen has to momentarily go blank and then redraw itself as you are seen from a new camera angle.

room to room with a number of foes, as you can be caught unprepared by the shift in perspective just long enough for a lethal claw slash to send you reeling.

It would have been much better had the game employed an active floating camera like that used in *Tomb Raider* to follow the game, and keep the interruptions down to a minimum. That said, *Ecstática 2* is a hoot, and well worth it if you feel like an intense fracas with a bunch of netherworldly denizens in sumptuous 3D.

Steve Polak

■ Distributor	Electronic Arts
■ Phone	(02) 9955 7744
■ Online	http://www.psygnosis.com
■ Price	\$99
■ Requires	Pentium 100, Windows 95, 4x CD-ROM, 16M RAM.
■ Classification	M
■ Rating	★★★★☆

Kiyeko and the Lost Night

What would you do in a world without night? What's the downside to always being able to see where you're going? For Kiyeko's family it's hot, dry days and no water in the river. Kiyeko goes out one day to hunt the tapir and overhears two snakes talking about how they've trapped the night. Despite his mother's warning not to go into the forest, he follows them.

Another delightful, albeit more contrived, 'digitale' from Ubi Soft, this beautifully illustrated title is based on a story by

Vladimir Hulpach called 'The Snakes Who Stole the Night'. It's a legend of how some snakes came to be poisonous, and why some have rattles in their tails.

Kiyeko and his father the chief trade off first a rattle (because, says the village wise man, snakes have a sense of rhythm) and next the poison that they use for their arrows, to reclaim the night from the snake king. Thus, the narrator says, mankind is responsible for the environment he finds himself in. Very pithy stuff.

The game can be played in five different languages — English, French, Spanish, Italian and German — and in active or passive mode. While not as interactive as some contemporary products on the market, the parts of the pictures that do respond to a click are neat, in particular the wild jungle flowers that produce a sublime funky jazz sound, and the purple-stockinged frog dancers, not to mention the cleverly-concealed chameleon.

Additionally, if you find yourself clicking around the page trying to make things happen, you'll start to notice flowers nod-



ding or antennae waving to attract your attention.

The CD-ROM also comes with a well-designed colouring and activities book, with join-the-dots, mazes and colouring pages to keep little fingers busy after it's time to power down the computer.

Suitable for four-year-olds and over, according to Ubi Soft, this game would probably wear out its welcome at about 10 years, so there is plenty of scope to get your money's worth.

Helen Dancer

■ Distributor	Metro Games
■ Phone	1902 240 527
■ Online	http://www.ubisoft.com
■ Price	\$69.95
■ Requires	486, DOS 5.0, Windows 3.1, 4M RAM, 2x CD-ROM, SVGA graphics

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Internet: <http://www.traxdata.com>

card recommended, Sound Blaster or 100% compatible soundcard.

■ **Classification** G

■ **Rating** ★★★

Payuta and the Ice God

Developed by French software publisher Ubi Soft, this delightful game for the under-10s will have most thinking adults equally spellbound.

Designed to be friendly for the PC-illiterate grown-up, it's a simple matter to load and run, and the package includes paper cutouts that are guaranteed to win any child's heart. All the characters in the story are there, to be coloured in and turned into stand-up, two-dimensional desk ornaments, presumably while the story is in progress, or so that children can act it out after the computer has been turned off.

Follow the story of Payuta fighting the evil ice god to reclaim the summer. You can choose whether to have the story read or to play inside the story. You can take a break in the story to turn the 'pages' of the book into multilevel logic puzzles and memory games, all with arctic themes. The puzzles range from easy ones for younger children, up to reasonably intricate ones for older kids. You can also practice hand/eye coordination by helping feed the gluttonous walrus, by guiding him around the screen to open his mouth.

Use the story to reinforce the learning of LOTE (Languages other than English), and be amused, as I was, at how the tim-

the penguin every time), changing from one language to another is quite seamless. Choose from English (not American), French or German.

For an extension of the game, plug in the modem and go to the Ubi Soft Web site at <http://www.ubisoft.com>.

Gorgeous pictures, clever implementation and use of media beyond CD-ROM, and top marks for a cultural, rather than purely fictional, exercise in reading, character recognition and logic sequences.

Helen Dancer

■ Distributor	Metro Games
■ Phone	1902 240 527
■ Online	http://www.ubisoft.com
■ Price	\$69.95
■ Requires	486, Windows 3.1, 2x CD-ROM drive, 8M RAM, SVGA graphics card and Sound Blaster or 100% compatible soundcard, modem and ISP connection to take advantage of Web extension.

■ **Classification** G
■ **Rating** ★★★★★

Yoda Stories

This is the year for Lucas and Co to come out with all guns blazing, merchandising the whole 'Star Wars' phenomenon to its full potential. Surprisingly, given the number of Star Wars games this year (with still more to come), the bulk of the titles released so far have been very good.

This is also true of the cute, extremely accessible Yoda Stories. Last month we looked at the multiplayer mayhem of X Wing vs TIE Fighter — impressive in a lot of ways, but user friendliness for novice gamers was never one



of the complicated Star Wars flight simulator's strong points.

Enter Yoda Stories, an excellent choice for the gaming acolyte who is curious but not particularly experienced. The game was initially designed as a brief and accessible desktop diversion — something to occupy a lunch hour. However, most games take longer than this. In the Yoda Stories you control Luke Skywalker and are randomly given a quest to complete, which usually involves picking up and ferrying a number of objects between creatures. There is also some combat of the simplest kind imaginable. You sometimes have to fight your way past the odd Imperial type, and this can be done with the aid of items like your light sabre or your blaster.

Players of Super Nintendo adventure games such as Zelda or Final Fantasy will be aware that Yoda borrows heavily from these console traditions. Thus character interaction is pre-scripted, incredibly simple, and at times frustrating (as the conversations are pretty much predetermined).

The visuals are among the game's least appealing features, as they are a little on the drab side, the only highlight being the Japanese anime-style representation of the characters. The game also uses a Windows-style interface that predictably contributes to the drabness.

However, Yoda Stories is a great diversion for the price and includes a CD full of previously unseen 'Star Wars' footage — a must-have for aficionados.

Steve Polak

■ Distributor	Metro Games
■ Phone	1902 240 527
■ Price	\$39
■ Online	http://www.lucasarts.com
■ Requires	Pentium 100, Windows 95, 4x CD-ROM, 8M RAM.
■ Classification	G
■ Rating	★★★★★



bre and tone of the narrator changes as you switch languages. It takes a bit of clicking around the page to actually figure out how to do these things, but once you hit upon the right icon (go for

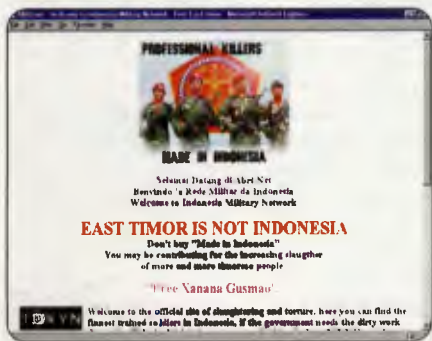


Does your taste run to archives of great hacks? Cutting-edge dance radio? Academic tomes? Whatever it is, Web File has it covered.

Hit that perfect beat

2600.com

Having your Web site hacked is the Internet equivalent of having a 'kick me' note stuck on your back in primary school — it makes you look a bit silly, everyone has a good old laugh



and it's forgotten in a week. Some kiddies do it to make a point, too.

Web site hacks are nearly always done to make a point, but the hacks are by nature transient, with far more people hearing about them than seeing them. At school some kind soul usually told you there was a note on your back so you could get it off. On the Net it's usually the Webmaster who finds the hack, and it disappears, pronto.

There have been some exceptions to this rule, where sites have been up for a while before anyone has figured out what happened. There are also allegations that some hacks are perpetrated by the site itself for publicity, like the recent alleged hoax hack on the Jurassic Park Lost World site. Generally, though, like the note-wearer, most people don't like being laughed at any longer than necessary.

The hacker community, as with most subcultures, has its own publications. 2600.com is only one of them, but it's notable for maintaining images of a number of well-known hacked sites. It's not comprehensive and mainly focuses on US hacks, but it's an interesting place to visit nonetheless. (At this point Web File will take the opportunity to warn potential visitors that some of the content on the hacked sites is most definitely adults only: exercise discretion, and don't say we didn't warn you.)

All the sites represented at 2600.com were hacked to make a political point, but

it's interesting to ponder the hackers' motivations and maturity when they are placing unsavoury material on some of the sites. Although confrontation politics can be effective, in the cases of the CIA and DOJ it seems almost counterproductive — pointless electronic terrorism conducted by emotionally immature hackers. In sharp contrast are the Kriegsman Fur and East Timor hacks (the latter pictured here), which make genuine political points and add effective hyperlinks to related sites without reverting to juvenile tactics.

The rest of 2600.com is moderately interesting, with updates on the Kevin Mitnick case, political harassment of alleged hackers, and an amusing section documenting public phones throughout the world. For those who believe that freedom of speech and freedom of expression should apply to the Internet on the same terms as in the physical world, 2600.com is an interesting insight into the maligned world of the hacker, and therefore worth dropping in on from time to time.

Josh Gliddon

■ **ONLINE** <http://www.2600.com>

■ **RATING** ★★☆☆

Wild FM

Out of reach of the long arm of the Australian Broadcasting Authority (ABA), the Internet looks set to be the ideal medium for niche radio stations. The first Australian Internet narrowcaster is Wild FM, "your 24-hour dance music radio station on the Web", which uses Audioactive to stream a live radio simulcast over the Internet.

A spin-off of Melbourne's HITZ FM, Sydney-based Wild FM is one of several community stations petitioning the ABA for an FM licence. In the meantime, it's keeping its audience and keeping its audience happy via the Web.

If you like music in long blocks of non-stop rock, then don't bother. Wild FM's dance mix is usually less than 12 months old from artists such as Whigfield, Spice Girls, Sash!, Amber, Crush and, just for old times' sake, Samantha Fox. The specialised content is the reason for the station's success. It targets a specific audience and provides music that's not played any-

where else. And this music is popular — in its first week on sale, the Wild FM compilation CD, which you can sample online, went to number one. In case you haven't got the youth message so far, Wild calls over-30s 'crusties'.

For a community station it sounds very professional, with a seamless run of pop rather than the clashing content and dead air of university radio. There's a lot of content, centred around the music, with profiles of artists and DJs, audio interviews, links and reviews of clubs in Sydney and Melbourne.

The audio stream is created by an Audioactive server and can be played through Shockwave or Audioactive plug-ins. There were some problems with both



when I first visited the site, but the Audioactive plug-ins were operational soon afterwards. Over ISDN the audio quality was equivalent to FM radio in stereo, although over 28.8Kbps it's more like AM in mono.

The page is fairly slow to download and doesn't really take advantage of Shockwave's animation capabilities. It works best with IE 3.01, which has the advantage of automatic installation and instantiation of plug-ins, so you don't have to save then launch the setup.exe and restart your browser.

Guide to ratings

★	LaToya Jackson
★★	Jermaine Jackson
★★★	Michael Jackson
★★★★	Janet Jackson
★★★★★	Completely Jackson-

It's surprising the site is not more interactive, given its 'underground' nature and its young, Net-aware audience. At the moment there is no real-time feedback and no music on demand. This will change somewhat as Wild FM starts to base its playlist on the most-requested songs, as well as adding online chat and conferencing capabilities.

If you like dance music then Wild FM is a must, and even if you don't, take a look for a glimpse of where radio is headed.

Dominique Jackson

■ **ONLINE** <http://www.wildfm.com.au>

■ **RATING** ★★☆☆

Co-op Bookshop

This latest addition to the swathe of Australian bookstores with an online presence has already found a niche. The Co-op Bookshop is the largest academic bookseller in Australia. While the Co-op Bookshop site provides general as well as academic material, it is in the academic arena that the site shines.



The site doesn't have the pizzazz of Dymocks, the curiosities of Gleebooks, or the discounts and breadth of the standard-bearer in this area, Amazon.com in the US. But it does enable students to purchase prescribed texts for courses online. Just choose your university or college from the list, indicate the semester number for the texts you require, and enter the subject code. The site will list your prescribed texts, which you can then order online. At present there are only three universities listed — the University of Queensland, Griffith University and Queensland University of Technology — but the plan is to include every institution in Australia. Once the information is received from each institution, it will go online.

The company has had a Web presence in the past, but the site has been beefed up to include about 1 million book listings.

Surfbaurd: I spy

It takes more than just a knack for skulking in the shadows or rummaging through people's garbage to be a great spy. Just look at James Bond (<http://www.mcs.net/~klast/www/bond.html>).

A trip to the alt.fan.james-bond newsgroup is where the *real* fans hang out. Here, the debate ventures deep into the details of 007's life. It has Windows 95 themes and downloadable Bond screen savers as well. Post a message saying that Timothy Dalton was a better Bond than Sean Connery and watch the sparks fly.

Who could forget Bond's antithesis — the bumbling, stumbling Maxwell Smart (<http://www.bcpl.lib.md.us/~cbirkmey/getsmart.html>)? He always got his man, and eventually Agent 99 too. But he didn't have the deadly escapist skills or seductive looks of Simon Templar, aka the Saint, (<http://www.saint.org/>).

While not quite in the same league as Bond or Smart, Scooby Doo (www.geocities.com/TelevisionCity/1145/) and Shaggy did their fair share of crime fighting, even if they were petrified most of the time. So did Smart's animated alter ego Inspector Gadget (<http://members.tripod.com/~inspector1/>).

If you want to use your razor-sharp intelligence and unflappable charm for good instead of evil, and you think you have what it takes to become a spy, then the SpyZone (<http://www.spyzone.com/CCSOP1.html>) may have a job opportunity for you. Don't be fazed by the very ordinary-sounding job descriptions — graphic designer, training instructor — remember that Maxwell Smart posed as a greeting-card salesman for years.

These are added to daily, and over 35% of these are already in stock. The search options are extensive, with three drop-down menus. The first allows you to choose to search by title, author, publisher or APN/ISBN; the second gives you word and phrase options and the third is used to write the search string.

Members of the Co-op receive a 12% discount on books, either online or at any store. The site will not be discounting to attract Web buyers, as the co-op doesn't want to disadvantage members with no Web access.

It is surprising there's no way to become a member online — you have to print and fax the membership form.

But why not go straight to the top? Enquire about vacancies and training at the CIA (<http://www.odci.gov/cia/cia-home.html>) or FBI (<http://www.fbi.gov/>) official home pages, but don't forget to read the job descriptions first (<http://www.job.uest.com/ooh1996/ooh/ooh16001.htm>). Don't overlook Britain's elusive MI5 and MI6 (<http://www.pair.com/spook/security/security.htm>) or the New Scotland Yard (<http://www.open.gov.uk/police/mps/home.htm>).

Our own ASIO doesn't seem to have a huge Web presence, but you can take a peek at some of its declassified documents at http://www.aa.gov.au/AA_WWW/Fact-Sheets/FS69.html.

Maybe breaking into the Kremlin and scaling tall buildings ain't your scene. But if you need to hire someone to do your dirty work, or just want to track down that lost love, there are dozens of 'investigative agencies' around (<http://idibbs.com/bus/shadowtr/t.p.htm>) happy to sell their services. Sydney-based investigators Drew and Julia Lindsay (<http://www.users.bigpond.com/DREW/L/>) will research everything from alleged arson cases to suspicious deaths and disappearances.

Staying up to date with industry news, gossip and breakthroughs is absolutely vital. There are numerous 'spy journals' online. Try Intelligence Online (<http://www.indigo-net.com/intel.html>) or Covert Action Quarterly (<http://www.worldmedia.com/caq/>). Another essential read is Warning Signs (<http://www.tscm.com/warningsigns.html>), an authoritative list of signs that your phone may be bugged.

Samantha Amjadali

Also, for most bookstores online or otherwise, the ability to browse is crucial. Research shows that most people entering a bookstore don't know what they want to buy, so most competing sites provide plenty of information on popular titles. If you want to browse, the Co-op site is not for you yet, as there aren't many places to wander (so far just a list of current bestsellers). 'Pulse' is under construction, however, and is promised to feature promos as well as interesting events.

Selina Mitchell

■ **ONLINE** <http://www.coop-bookshop.com.au>

■ **RATING** ★★★

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How much wood would a woodchuck chuck if a woodchuck could chuck wood? This is one of the many intriguing questions that aren't answered in this month's Chip Chat.

Chip Chat

Postcards from the edge

Here's a quick quiz. Is the best way to encourage people to upgrade their software:

- 1 including useful features that people actually want, at a price they can afford?
- 2 including all the bug fixes that should have been in the original?
- 3 marketing the living hell out of the new release?
- 4 sending prospective customers a postcard of a dentist wielding a drill?

While practically no-one who has ever purchased software is going to fall for explanation 1, explanations 2 and 3 seem right on the money. So you may be a little surprised to learn that Quicken has decided that sending out a postcard featuring an evil dentist is the best way to encourage people to upgrade to Version 6.0. Frankly, we're so traumatised by the picture that money is the last thing on our minds.

Strange mail, part 2

Regular readers will remember our June contest to identify the author of a particularly incoherent piece of mail we received, consisting of a highly-annotated page of APC. While in the process of picking a winner from the virtual mound of entries, we encountered a sight nearly as disturbing as the mail which inspired the contest. One psychotic reader decided to emulate the sender of the original mail and send in a copy of Chip Chat, complete with misspelt incoherent ramblings in Texta and correction fluid. This is exactly the sort of mindless stupidity we were hoping to avoid. We'd say "bring back national service", but we wouldn't want to be accused of giving politicians still more ludicrous ideas for reforming the nation.

However, we braced ourselves, ate more chocolate-covered coffee beans than would be strictly considered as health-

enhancing, and eventually managed to select a winner. This was no easy task: some of the more impressive answers ranged from insane university lecturers (a popular target) to blaming Kevin Maney, the author of the infamous 'Java is communist' article. However, our favourite answer came from Peter Craddy, who wrote:

Could it be John Howard's first revision of his 10-point plan for native title? Given the rantings and ravings of the unknown scribe, it certainly appears to be the case, and the writer makes no apologies or gives any explanation why.

Peter wins a year's subscription to APC for his suggestion. Other entrants need not despair; there's another contest below.

Culture shock

They don't call it the World Wide Web for nothing, you know. This month's cultural insensitivity and general stupidity award goes to the PR company responsible for issuing a release announcing that AT&T is now offering local Internet services for Papua New Guinea. Scrawled across the front of the announcement was this message:

A photo showing tribal warriors encountering the electronic age is available on request.

We don't want to embarrass the PR flacks involved by naming them again, but you can find a pretty good clue to their identity at the bottom of page 240 in our April edition.■

Contest: Ain't no mountain thick enough

Diana Ross is famous for having lots of hair, singing lots of catchy tunes (both on her own and with the Supremes), wearing really bad frocks and too much fur, and being a bitchy superstar type. Now it seems she's also a bit of a soothsayer, especially when it comes to the Web. You may not have been aware of this; neither were we, until we encountered the fol-

dawn of a new century on the horizon. I've come to realise that my life is a reflection of my generation and my world. I always believed that someday our hopes and dreams would come into sharp focus. That in this time, I, along with you, would be looking ahead, not back, and seeing the promise in the future fulfilled every day. Finding the freedom to pursue a vision that has been honed and refined over the years without my ever knowing it was happening.

There's a bucketload more of this self-indulgent rubbish at the site, but we're digressing from our main purpose, which is yet another reader contest. Diana Ross may be an unlikely prophet for the interactive future, but there are bound to be even dumber predictions online that we haven't encountered yet. Send us the URL of the stupidest comment about the online world you've encountered, be it from a globe-trotting celebrity or a complete nonentity. The reader who submits the most amusing entry will win a year's subscription to APC. Enter on our Web site at <http://apcmag.com>, send email to dianawho@acp.com.au, or write to Diana Who?, APC, PO Box 37, Sydney NSW 1028. Entries close August 31, 1997; the winner's name will be published on our Web site. For full terms and conditions, see page 221.



lowing comments on the official Diana Ross Web site (<http://www.dianaross.com>):

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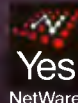
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